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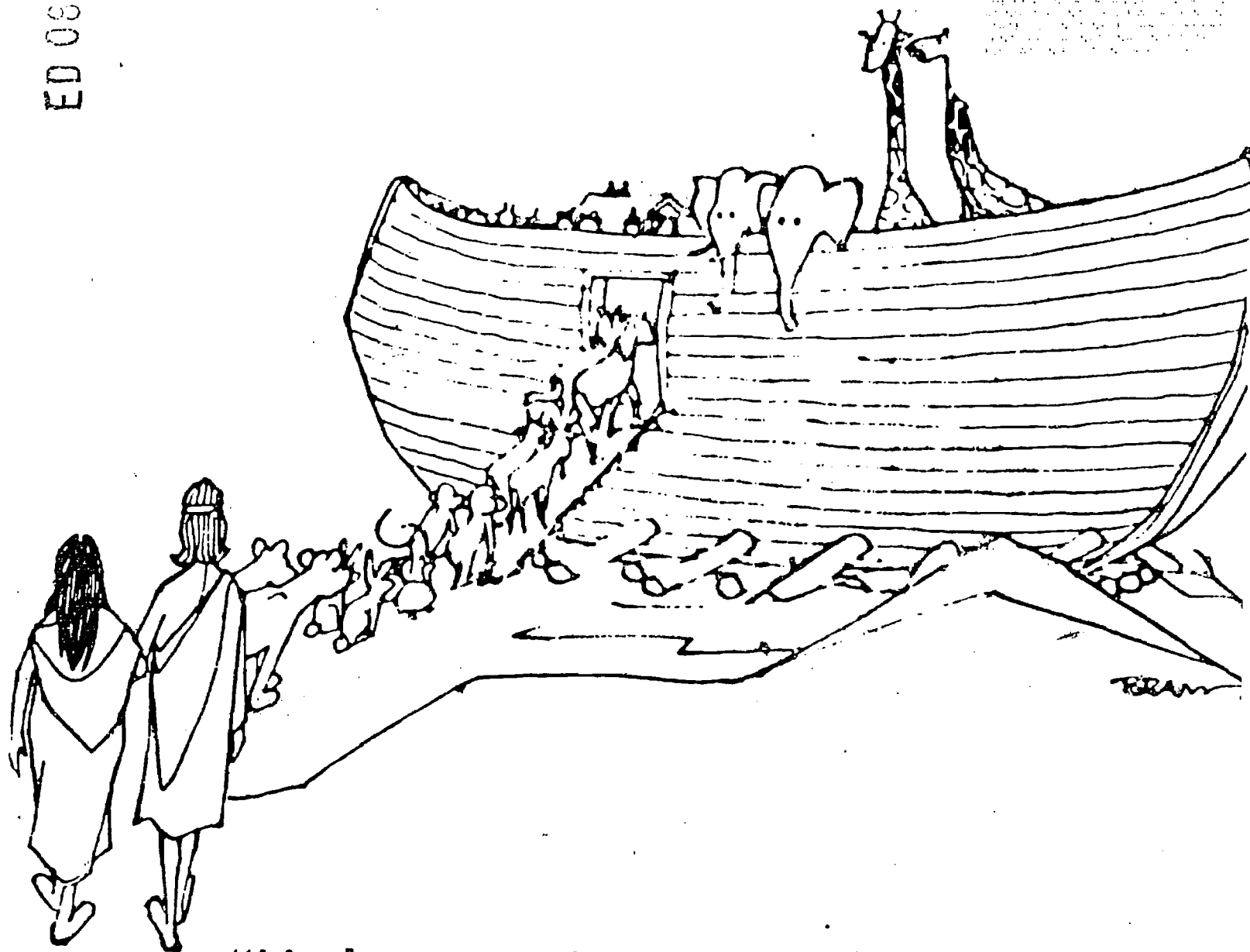
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ABSTRACT

Selected and prepared by classroom teachers, these environmental education exercises were developed to be incorporated into specific subject matter areas, not to provide an additional course or unit. Activities in this teacher's guide for elementary grades 4-6 are directed toward art, language arts, science, social studies, and special education. Each of the 55 exercises enumerates in outline form the title of the lesson, behavioral objectives, materials needed, major activities, follow-up activities, evaluation questions or objectives, and reference materials. Charts or diagrams are included where necessary to supplement the explanations. This work was prepared under an ESEA Title III contract. Related documents are SE 016 629, SE 016 631, and SE 016 632. (BL)

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U.S. DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
NATIONAL INSTITUTE OF
EDUCATION



**"Mark my words! If THEY come aboard,
the trouble will start all over again!"**

ENVIRONMENTAL EDUCATION
EXERCISES

Bourbon County Schools
Environmental Education Department
Paris, Kentucky 40361

ELEMENTARY
4-6

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FOREWORD

The enclosed "Exercises" were selected and prepared by classroom teachers. They were developed to be incorporated into specific subject matter areas and not to provide an additional course or unit.

Many teachers have been teaching environmental topics and several of these are included. Programs from around the country were reviewed and selections made from these that were applicable to our situation.

Several "Exercises" were intended to be used in the out-of-doors. Many school grounds have a variety of plants and animals which can be used for outdoor studies.

BOURBON COUNTY SCHOOLS
ENVIRONMENTAL EDUCATION DEPARTMENT
HAROLD GROOMS, COORDINATOR
PARIS, KENTUCKY 40361

November, 1972
(Revised Edition)

TITLE III, ESEA
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400 LAFAYETTE PARKWAY
LEXINGTON, KENTUCKY 40503

TABLE OF CONTENTS

	Page
ART EXERCISE PLANS BY BETSY COX	
Exercise #1, Winter Color.....	4
Exercise #2, Color Wheel.....	5
Exercise #3, Landscape Painting with Nature's Colors.....	8
Exercise #4, Nature Prints: Spider Web Prints.....	8
Exercise #5, Nature Prints: Spore Prints.....	9
Exercise #6, Nature Prints: Blueprints.....	10
Exercise #7, Nature Prints: Smoke Prints.....	11
Exercise #8, Nature Prints: Tempera Leaf Prints.....	12
Exercise #9, Nature Prints: Stamping Art.....	13
Exercise #10, Weaving with Grasses and Seeds.....	14
Exercise #11, Sand Painting.....	14
Exercise #12, Collages or Construction.....	15
Exercise #13, Sketchbook.....	16
Exercise #14, Rock Mosaic.....	16
Exercise #15, Poster Contest.....	17
LANGUAGE ART EXERCISE PLANS BY DAVID WAGONER	
Exercise #1, Insects and Plants Used in Poetry.....	20
Exercise #2, Strip Mining.....	21
Poems.....	24
Fables.....	26
Poems.....	27
SCIENCE EXERCISE PLANS BY RUTH EWALT	
Exercise #1, The Weather Station.....	29
Exercise #2, Weather Instruments.....	30
Exercise #3, Bird Feeders.....	33
Exercise #4, Winter Tree Identification.....	35
Exercise #5, What Good are Insects?.....	37
Exercise #6, Bird Identification.....	39
SCIENCE EXERCISE PLANS BY CAROL O'BRIAN	
Exercise #1, Clay.....	43
Exercise #2, Coal.....	44
Exercise #3, Forestry Products.....	46
Exercise #4, Insects.....	51
SOCIAL STUDIES EXERCISE PLANS BY SUSAN RHODUS	
Exercise #1, Animal Tracks.....	55
Exercise #2, Water Pollution.....	57
Exercise #3, Air Pollution.....	58
Exercise #4, Tombstones Tell All.....	61
Exercise #5, Plant Communities.....	62
Exercise #6, Land Use.....	63
Exercise #7, Dams.....	65
Exercise #8, Songs, Finger Plays and Games.....	66
SOCIAL STUDIES EXERCISE PLANS BY CONNIE PADGETT	
Exercise #1, Litter and Solid Waste.....	75
SOCIAL STUDIES EXERCISE PLANS BY BRENDA WALKER	
Exercise #1, Our Beautiful Wildlife.....	79
Exercise #2, Wildlife is Helpful to Man.....	80
Exercise #3, The Food Chain.....	82
Exercise #4, Extinction.....	83
Exercise #5, Reasons for Our Vanishing Wildlife.....	85
Exercise #6, Conservation: Hunting Laws and Sanctuaries.....	87

TABLE OF CONTENTS (cont.)

	Page
SPECIAL EDUCATION EXERCISE PLANS BY MARJORIE CLEAVER	
Exercise #1, Water in Your Home.....	90
Exercise #2, Water in Industries and Agriculture.....	91
Exercise #3, The Hydrologic Cycle.....	95
Exercise #4, Water Pollution.....	100
Exercise #5, Water Treatment: Before Using, After Using.....	101
Exercise #6, What Can You Do to Help Save Our Water Supply?.....	103
Exercise #7, Animals and Their Young.....	105
Exercise #8, Wildflower Study.....	107
Exercise #9, Plants that Poison.....	109
Exercise #10, Weather Folklore.....	110
Exercise #11, Enjoy a School Nature Garden.....	112
SPECIAL EDUCATION EXERCISE PLANS BY SUE GILVIN	
Exercise #1, Social Behavior: Anti-Littering Campaign.....	116
Exercise #2, Appreciation of Our Environment Through Our Senses.....	123

ART EXERCISE PLANS
Incorporating Environmental Studies

ELEMENTARY SCHOOL LEVEL

Sources Consulted in Developing:

Environmental Education: Objectives and Field Activities
Paducah Public Schools
Paducah, Kentucky

Southeastern Pennsylvania Outdoor Education Center
Sycamore Mills Road
Media, Pennsylvania

Compiled by:

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Title of Lesson: Winter ColorObjectives:

- 1) To enrich concepts of color
- 2) To discriminate colors
- 3) To enrich concepts of growth in plant life
- 4) To encourage sensory perception

Materials Needed:

For follow-up activity:

- 1) Poster paint (all colors) or water colors
- 2) White poster paper or water color paper

Activities:

On the bus or along the walk to the field site, divide the class into groups and keep score of colors seen: 1 point--gray; 1 point--brown; 1 point--black; 2 points--green; 3 points--red; 4 points--blue; 5 points--yellow. Objects must be natural objects: not houses, cars or clothing, etc.

What colors do you think of when you think of the outdoors in winter? What color is the sky? the grass? the trees? What colors do you see when you look around outdoors? What color is the grass? Is it all the same color? If not, what seems to make the difference? Is the grass dead? What makes you think this? What colors are the fallen leaves on the ground? Are all leaves of one kind the same color? Try to make up names to describe the colors of the leaves and grass. Can you find one the color of sandpaper? of hot cocoa with and without a marshmallow? Are the leaves dead? What makes you think this? What colors are the leaves that are still on plants? Are these leaves dead? How can you tell if a leaf on a plant is dead or not? How do the colors compare with those of the leaves on the ground? What colors are the branches of trees and shrubs? Can you find a branch that was last summer's growth? Is it any different in color from the older bark? When do you suppose the change in color takes place? What causes the change? Do you think the branches are dead? Why or why not? What will become of the buds? What colors are buds on trees and shrubs? How would you describe the colors you find on buds and branches? Look at trees in the distance. What colors do you see? Can you find trees nearby which you think are the same kind as those in the distance? How did color help you? How many different kinds of trees can you pick out in the distance? What color is the sky? Is it the same color all over? Look close to the horizon. Is the sky lighter or darker close to the horizon than overhead? What colors are the clouds? What parts of a cloud are darkest? lightest? What color is the snow? What colors are shadows on snow? What color is the ground? What colors do you see in the water of a pond or stream? Are these colors in the water? in things in the water? are they reflections? What colors are the tree trunks? What colors do you see on birds? Are the light colors mostly on the underside or topside? How do the colors of birds and other animals compare with the other colors you see outdoors at this time of year? Are these birds around here all year? Will their colors be the same all year? What colors are the berries that are still on shrubs?

Why do you suppose the berries are the brightest part of many plants in winter? What color is ice? Look for ice in places other than on ponds or streams. What color is an icicle? Is it all transparent? Is it translucent? Is all the ice on a pond or stream the same color? What seems to make differences in color? (Some winter residents, such as the junco--sometimes called "snowbird" because its colors blend so well with the black, white and grey winter landscape--migrate north in spring. Others, such as the goldfinch, change from the drab winter browns to brighter summer hues.)

Follow-up Activities:

- 1) Adopt a tree or shrub near your home or school and keep a pictorial record of it for the rest of the winter into spring.
- 2) Experiment with mixing white with other poster paint colors to match colors seen outdoors. Paint a picture of the place you visited on the field trip. Consider both the physical appearance and the mood (what you felt about the forest).

Evaluation:

- 1) Do students exhibit an appreciation for the colors in nature?
- 2) Are students aware of how color is a sign of change in their total environment?

Reference Materials:

- 1) Audubon Mammal Study Program, Bourbon County Schools Materials Center
- 2) Audubon Plant Study Program, Bourbon County Schools Materials Center
- 3) Audubon Tree Study Program, Bourbon County Schools Materials Center
- 4) "Why Leaves Change Color", USDA

EXERCISE #2

Title of Lesson: Color Wheel

Objectives:

- 1) To enrich concepts of color
- 2) To discriminate the primary colors and understand that secondary colors are made from primary ones
- 3) Become aware of value differences

Materials Needed:

- 1) 14" round oaktag or stiff paper
- 2) Natural Materials collected by students and brought to the classroom
- 3) Glue (clear-drying)
- 4) White paper and construction paper for Hue Wheel

Activities:

Make wheel according to diagram, cutting out construction paper for each color indicated on the diagram. Place this wheel in center of

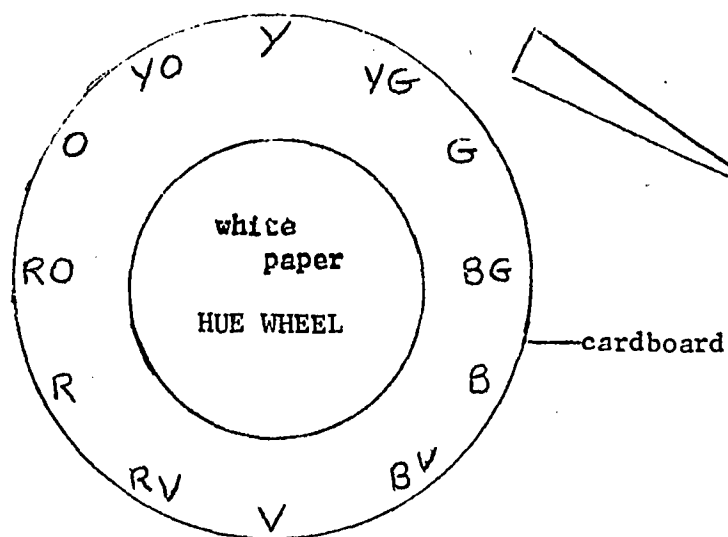
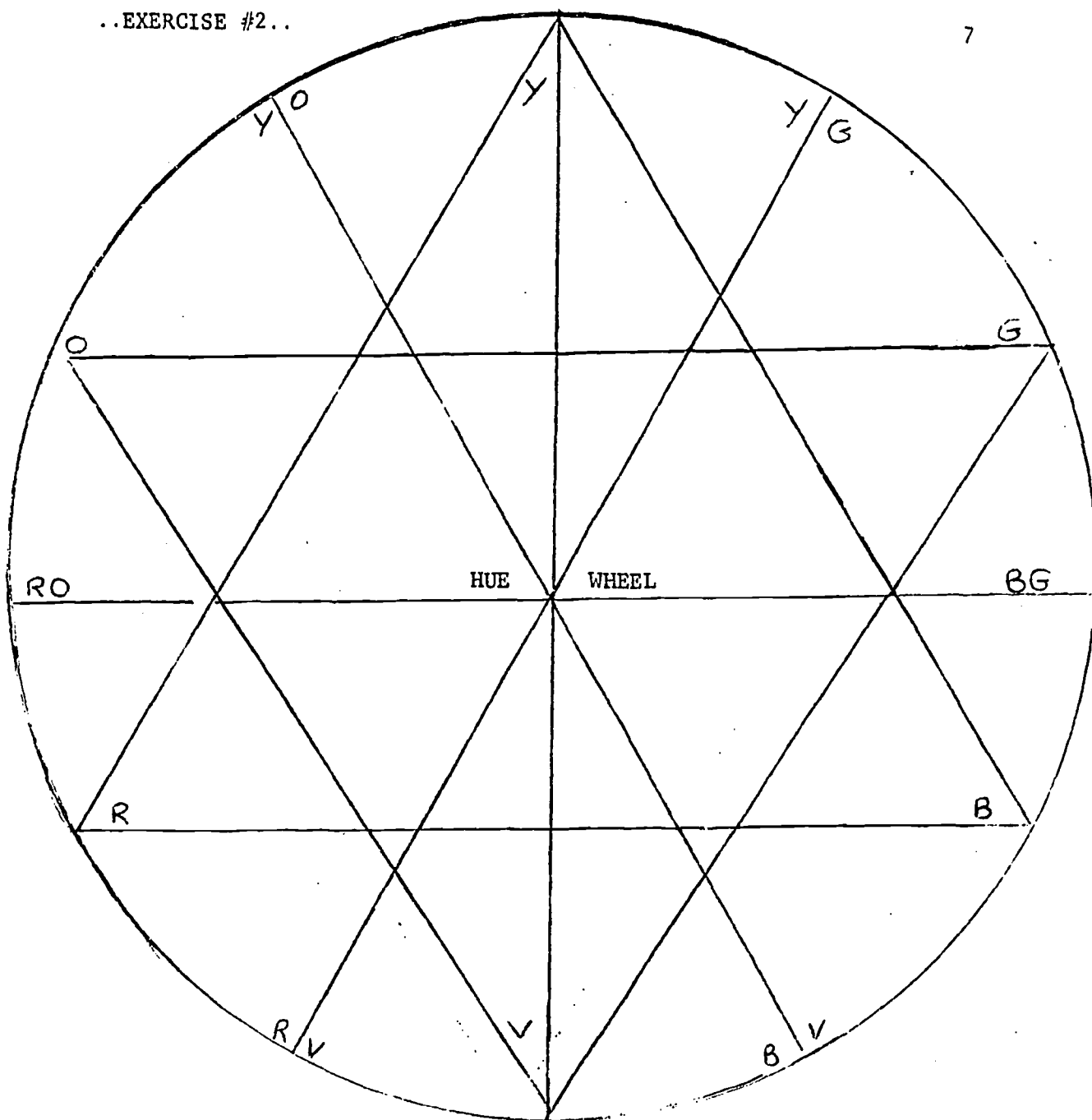
14" oaktag wheel which has been marked and labeled according to the diagram. Using center wheel as a guide, place natural materials in correct positions on wheel. Each student will be using different objects and will be able to express different values of each color.

Follow-up Activities:

- 1) Display all wheels and discuss differences, relating color concepts.
- 2) This could be done as a class bulletin board with groups of students working on each color.

Evaluation:

- 1) Do students exhibit an appreciation for the colors in nature?
- 2) Do students understand value, primary and secondary colors?
- 3) Were students enthusiastic in identifying natural color?



Cut from construction paper and glue on wheel in correct position. Select colors as near as possible to points labeled.

Mark cardboard wheel same as paper one. Glue paper wheel onto cardboard. Students can use center as guide for natural materials.

Title of Lesson: Landscape Painting with Nature's ColorsObjectives:

- 1) To develop an appreciation for ingenuity of people of the past
- 2) To enrich concept of color and sensory perception
- 3) To learn various methods of obtaining natural colors
- 4) To learn to create without relying on commercial materials

Materials Needed:

- 1) Drawing paper
- 2) Natural colors (gathered previously by students if this is to be a classroom activity)
- 3) Natural tools for painting

Activities:

The landscape can be the school yard or something within sight of the school or a class field trip to an area away from civilization (if the latter, colors may be gathered on the site). Nature is full of color and utensils to aid the artist. With a little effort, one can find natural dyes such as the natives used. It is also possible to find ways to get our colors onto the paper. Some students may use fingers, others will make brushes from twigs. By mashing berries, squeezing leaves, grasses or flowers, using dirt, clay or coal, marking with rocks, etc. one can develop his dyes. If students have not made a color wheel, they might experiment with making their own colors with this method, rather than doing the landscape painting.

Follow-up Activities:

Students may disclose what colors resulted from their various experimentations.

Evaluation:

- 1) Were students enthusiastic about this project and eager to experiment?
- 2) Do students have a better understanding of color?

EXERCISE #4

Title of Lesson: Nature Prints: Spider Web PrintsObjectives:

- 1) To construct different kinds of nature prints for display or collection
- 2) To recognize various prints and objects in nature by the patterns created
- 3) To demonstrate an awareness of shape and texture in nature
- 4) To enrich the concepts of shape and texture by understanding the development of line from simple to complex (line=shape=size=pattern)

Materials Needed:

- 1) Dark-colored construction paper
- 2) White enamel spray paint
- 3) Scissors
- 4) Plastic spray or hair spray

Activities:

Locate a spider web and gently persuade spider to move off, if there is one, as you won't want to kill it. Check around the web to be sure there is nothing the paint would harm. Check the direction of the wind and spray with the breeze the web lightly with paint on both sides. When all parts of the web have been sprayed, ease paper close to the underside or back of web being careful not to disturb the web. Try to touch paper to all parts of the web at once. As soon as the web is stuck to the paper, snip the lines at the edges of the paper very carefully capturing the web from its surroundings. There you will have the spider's work outlined on a flat surface to dry. When it is dry, you may want to preserve it by spraying the entire paper with plastic spray or hair spray.

Follow-up Activities:

Using string, have students construct a large spider web in class for a bulletin board background.

Evaluation:

- 1) Do the students have an understanding of the workings of spiders?
- 2) Did students dispel some of their fears or dislikes of spiders and gain an appreciation of this creature?
- 3) Are students able to recognize patterns in nature?

Reference Materials:

"Spider Webs", Activity #23, Southeastern Pennsylvania Outdoor Education Center (available at the Bourbon County Schools Materials Center)

EXERCISE #5

Title of Lesson: Nature Prints: Spore PrintsObjectives:

- 1) To construct different kinds of nature prints for display or collection
- 2) To recognize various prints and objects in nature by the patterns created
- 3) To demonstrate an awareness of shape and texture in nature
- 4) To enrich the concepts of shape and texture by understanding the development of line from simple to complex (line=shape=size=pattern)

Materials Needed:

- 1) Mushroom cap
- 2) Light-colored paper
- 3) Gum arabic or glue
- 4) Glass or plastic dish

-or-

- 1) Mushroom cap
- 2) Wax paper
- 3) Electric iron
- 4) Glass dish
- 5) Construction paper

Activities:

In this exercise, the fungus usually prints itself. To make the spore print, cut the mushroom from its stem, close to the gills. Coat hard surfaced sheets of paper with glue and place the mushroom cap, rounded side up, gill side down, upon the paper and cover with the glass dish. Let the mushroom stand for a while, overnight if possible, making sure not to move it while the spores are dropping onto the paper. If it is not disturbed, an exact print of the underside of the mushroom should occur. Spore prints may be made with wax paper if an iron is available. Use same directions as above except place the mushroom cap on wax paper and cover with glass dish. After spore print has set, to make it permanent, heat wax paper with electric iron set on "low". Turn iron, warm flat side up, and place underside of wax paper on iron. The spores will settle into the melting wax. The print may then be mounted on colored construction paper for contrast.

Evaluation:

- 1) Are students able to see patterns in nature?
- 2) Do students understand the development of patterns from line?

EXERCISE #6

Title of Lesson: Nature Prints: BlueprintsObjectives:

- 1) To construct different kinds of nature prints for display or collection
- 2) To recognize various prints and objects in nature by the patterns created
- 3) To demonstrate an awareness of shape and texture in nature
- 4) To enrich the concepts of shape and texture by understanding the development of line from simple to complex (line=shape=size=pattern)

Materials Needed:

- 1) Ozita paper (high-speed blueprint paper)
- 2) Piece of glass with smooth edges (window pane may be used)
- 3) Cardboard (same size as glass)
- 4) Small jar filled with ammonia (covered until needed)
- 5) Fern, plant, leaf or other flat object to be printed
- 6) Masking tape

Activities:

Make a printing frame by placing the glass upon a piece of cardboard the same size as the glass. Hinge them together at the top with masking tape. To print, lift glass cover and place a piece of blueprint paper, treated side up, on the cardboard. Put leaf or other object to be printed on top of the paper and lower the glass. Expose to sunlight until paper becomes white. Remove paper from frame and place in large covered container filled with ammonia fumes. This is achieved by placing a small uncovered jar or ammonia inside the large container. Leave prints inside the large container for about 5 minutes or until print is set. This step of the exercise should be carefully supervised. (Note: Be sure to keep the blueprint paper stored in heavy envelop or other light-free container as the paper will be ruined if exposed to light.)

Evaluation:

- 1) Did students work enthusiastically on this process?
- 2) Are students able to recognize patterns?

Reference Materials:

"Learning About Leaves", Encyclopedia Britannica Films, 1150 Wilmette Avenue, Wilmette, Illinois

EXERCISE #7

Title of Lesson: Nature Prints: Smoke PrintsObjectives:

- 1) To construct different kinds of nature prints for display or collection
- 2) To recognize various prints and objects in nature by the patterns created
- 3) To demonstrate an awareness of shape and texture in nature
- 4) To enrich the concepts of shape and texture by understanding the development of line from simple to complex (line=shape=size=pattern)

Materials Needed:

- 1) Candle
- 2) Matches
- 3) Lard or other type of shortening

- 4) Typing paper
- 5) Leaf
- 6) Newspaper (optional)

Activities:

Take a sheet of typing paper and grease the surface lightly with a little lard. Light candle and smoke greased paper by moving it quickly back and forth over the flame. When the surface is black with soot, place soot side of paper up and put leaf, vein side down, on the blackened surface. Cover leaf with another piece of paper (newspaper would do for this or use another piece of typing paper) and rub until every part of the leaf is inked thoroughly with soot and grease. Lift leaf and place inked side down on a clean piece of typing paper. Cover with another piece of paper (any kind) and rub the entire leaf. Be very careful not to move the leaf as this will blur the print. When every part of the leaf has been carefully rubbed, remove and discard the top paper and leaf. This is one of the most primitive methods of printing and results in a delicate, etching-like print.

Evaluation:

- 1) Are students understanding the different kinds of prints and how they might be an aid in learning?
- 2) Were students able to identify differences in leaves by their shapes?
- 3) Do students understand the relationship of line, shape and pattern?

Reference Materials:

"Learning About Leaves", Encyclopedia Britannica Films, 1150 Wilmette Avenue, Wilmette, Illinois

EXERCISE #8

Title of Lesson: Nature Prints: Tempera Leaf PrintsObjectives:

- 1) To construct different kinds of nature prints for display or collection
- 2) To recognize various prints and objects in nature by the patterns created
- 3) To demonstrate an awareness of shape and texture in nature
- 4) To enrich concepts of shape and texture by understanding the development of line from simple to complex (line=shape=size=pattern)

Materials Needed:

- 1) Powdered tempera paint
- 2) Water
- 3) Container for mixing
- 4) Leaf
- 5) Paper
- 6) Brush (optional)

Activities:

Mix a small amount of powdered tempera paint with water and pour or brush the mixture onto the paper. Place leaf, vein side down, on paint. Put another piece of paper on top of the leaf and rub all parts thoroughly. Remove leaf and place, vein side down, on a fresh piece of paper on which leaf is to be printed. Once again, put another piece of paper on top of the leaf and rub. A colored leaf print will result. Different parts of the leaf may be pressed into different colored tempera to make prints of autumn leaves changing colors. Shoe polish can also be used successfully with this technique.

Evaluation:

- 1) Were students able to identify differences in leaves by their shapes?
- 2) Do students understand the relationship of line, shape, texture and pattern?

Reference Materials:

"Learning About Leaves", Encyclopedia Britannica Films, 1150 Wilmette Avenue, Wilmette, Illinois

EXERCISE #9

Title of Lesson: Nature Prints: Stamping ArtObjectives:

- 1) To enrich feelings for natural materials as a source of design
- 2) To enrich art concepts of shape, color and texture
- 3) To construct different kinds of nature prints for display or collection
- 4) To recognize various prints and objects in nature by the patterns created
- 5) To demonstrate an awareness of shape and texture in nature
- 6) To enrich the concepts of shape and texture by understanding the development of line from simple to complex (line=shape=size=pattern)

Materials Needed:

- 1) Natural materials, fruits and vegetables (experiment and find these most suitable: oranges, apples, peppers, cucumbers, celery, grapefruit, nuts, cabbage, bark, twigs, mushrooms, leaves, etc.)
- 2) Foam rubber (water soaked) coated with tempera paint or India ink
- 3) Paper (rice is best; newsprint or construction paper)
- 4) Firm stamping surface

Activities:

Moisten surfaces of objects on water soaked foam pad coated with tempera paint or India ink. Stamp on paper. Encourage creative designing and combining of materials. If using leaves, place another sheet over leaf and rub thoroughly to make imprint. Instead of placing leaf on pad, a roller may be inked and rolled over leaf before leaf is pressed onto paper.

Evaluation:

- 1) Do the students have the feeling they are designing something by themselves?
- 2) Do students understand the meaning of overlapping in relation to space and distance?
- 3) Did students experiment with color and patterns?

Reference Materials:

Forms and Patterns in Nature, Strache, Wolfe; New York, Pantheon, '56

EXERCISE #10

Title of Lesson: Weaving with Grasses and SeedsObjectives:

- 1) To enrich concepts of texture and pattern
- 2) To create understanding of variety of uses and qualities of materials

Materials Needed:

Cut and dried grasses and seeds

Activities:

Weave materials in various designs, experimenting to discover possibilities. These may be left as mats or shaped into baskets, bowls, pots, and other ideas students may develop.

Evaluation:

- 1) Do students understand the variety of uses of materials?
- 2) Have students discovered the qualities of materials?

EXERCISE #11

Title of Lesson: Sand PaintingObjectives:

To enrich concepts of line, texture and pattern

Materials Needed:

Sandy soil area or school ground's sand box (each student should have an area 12"-20" square)

Activities:

Design in the sand using fingers or twigs as drawing tools. Many creative designs may come of this activity. This can be combined with a photography experiment. As students complete their designs,

photograph them. These may be suitable for enlarging and framing.

Evaluation:

- 1) Do students use line well in developing patterns?
- 2) Are students creative in designing in sand?
- 3) Do students see analogies between line and texture in nature and in paintings?

EXERCISE #12

Title of Lesson: Collages or Construction

Purpose:

Collages are studies in design and composition. A construction is a collage, but is differentiated in that it employs heavier material, and can be 3-D.

Objectives:

- 1) To enrich concepts of shape, texture and color
- 2) To develop appreciation for natural art and creating art without commercial materials
- 3) To develop an awareness of the need for conservation

Materials Needed:

- 1) Rocks
- 2) Grass
- 3) Weeds
- 4) Twigs
- 5) Glue
- 6) Oaktag on heavy paper or wood

Materials collected should not be live. Collect objects already on the ground. Do not take more material than is needed.

Activities:

Arrange materials on oaktag in a pleasing and suitable design. Consider the balance that is required of the materials selected. Overlapping will create a more interesting finished product. Once the design is completed, glue down all parts. For activities of this type, it is suggested that students be given prior notice of the kinds of things to be collecting. Each student should bring a bag or box of materials to class and share with other students for a greater selection of materials. If there is space available, materials should be sorted and stored where they are accessible to all students.

Evaluation:

- 1) Do students understand concepts of shape, color and texture?
- 2) Are students aware of natural art and creating with natural materials?
- 3) Do students understand that the inspiration of all art is in nature?
- 4) Are students more aware of the need for conservation?

Reference Materials:

Nature as Designer, Bager, Bertel; International Textbook Company,
Scranton, Pennsylvania

EXERCISE #13

Title of Lesson: Sketchbook

Objectives:

- 1) To enrich concepts of design elements
- 2) To develop keen awareness of variety and similarity in nature
- 3) To enrich concepts in science
- 4) To increase observation powers

Materials Needed:

- 1) Sketchbook
- 2) Soft-lead pencils

Activities:

Each student should keep his own book for a period of time and add to it as required by in-class study of various concepts. Following detailed studies of each, birds, flowers, trees, leaves, etc. to include parts and habits, etc., each student can study the bird, tree, flower or leaf, etc. and make a sketch from a life model. Having studied the specimen in class, observation powers should be keener and his ability to draw accurately improved. Students will be able to add more and more details as they have more experiences and will begin to include the environment of each specimen.

Evaluation:

- 1) What changes in observation skills do you notice?
- 2) Has awareness of the total environment increased (interaction--interdependence)?
- 3) Are student abilities to identify specimen improving?

Reference Materials:

Audubon Study Programs available at the Bourbon County Schools Materials Center

EXERCISE #14

Title of Lesson: Rock Mosaic

Objectives:

- 1) To enrich concepts of line, texture, color and pattern
- 2) To develop an awareness of variety and similarity

Materials Needed:

- 1) Rocks
- 2) Oaktag or wood
- 3) Glue

Activities:

Arrange rocks in suitable and pleasing design. Other materials may be added to accomplish desired effect. The class could be divided into groups with 5 or 6 students working on each design. When the design is completed, glue all parts in place.

Evaluation:

Are students aware of variety and similarity in nature patterns?

Reference Materials:

- 1) The Wonder of Stones, Gans, Roma; Crowell, New York, '63
- 2) "Rocks: Where They Come From", Coronet Films, 65 E. South Water Street, Chicago, Illinois

EXERCISE #15

Title of Lesson: Poster ContestObjectives:

- 1) To develop awareness of need for conservation
- 2) To enrich concepts of design elements
- 3) To develop awareness of need for working together cooperatively
- 4) To increase awareness of problem areas and solution possibilities

Materials Needed:

- 1) Poster paper
- 2) Variety of materials for illustrating posters (poster paints, construction paper, felt-tip marking pens)
- 3) Glue

Activities:

Encourage original and creative methods of illustrating a point related to environmental problem areas. Provide suggestions of problems and possible illustrations (see attached).

Follow-up Activities:

Select winners and designate with ribbons. Talk to local merchants about putting posters in their window. Display as many posters as possible.

Evaluation:

- 1) Are students exhibiting constant awareness of problem areas?
- 2) Do students enthusiastically accept challenge of working together to improve their environment?

- 1) From Sea to Shining Sea (junk cars piled to top of poster)
- 2) Thanks for Lunch (rats eating out of trash can)
- 3) For Purple Mountains Majesty (a mountain of cars)
- 4) America the Beautiful (burned, naked trees)
- 5) A Beautiful World: Don't Spoil It (trees, mushrooms, butterflies)
- 6) Can of DDT and Human Hand Spraying Bugs (people lying dead)
- 7) Isn't America Beautiful (man on stilts with clothespin on nose, sewer pipe running in, walking in sewage)
- 8) Save Our Nation from Disaster: Stop Pollution (town background, air pollution, river pollution, natural surroundings with litter)
- 9) Save Natural Resources (picture of tree and big frogs)
- 10) The Funeral (birds sitting around tombstone and on tombstone, for example, "Ben R.I.P. died of DDT")
- 11) This Is Our Community (snapshots of old houses completely littered, poverty, trash, old cars, etc. or 8 pictures torn around and pasted on)
- 12) Wanted: Alive (eagle on a limb)
- 13) Fight for Your Life (over-littered background)
- 14) Price of Progress? (pollution)
- 15) The Green, Green Grass of Home (littered yard with big house)
- 16) Where Have All the Flowers Gone? (cover poster with road signs)
- 17) What Goes Down, Must Come Up (poster with softdrink cans; all types of litter pasted on)
- 18) Original ideas are always better

Prepared by:

Bourbon County Schools
Environmental Education Program
Paris, Kentucky 40361

LANGUAGE ARTS EXERCISE PLANS
Incorporating Environmental Studies

ELEMENTARY SCHOOL LEVEL

Compiled by:

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Title of Lesson: Insects and Plants Used in Poetry

Behavioral Objectives: At the conclusion of these activities, the student will be able to:

- 1) Write a sijo poem using insects or plants from nature as the theme
- 2) Write a haiku poem using insects or plants from nature as the theme
- 3) Write a cinquain poem using insects or plants from nature as the theme
- 4) Exhibit skills in syllabication

Materials Needed:

- 1) Nature objects
- 2) Black construction paper
- 3) Poster board
- 4) Florescent crayons
- 5) Ruler
- 6) Black light
- 7) Felt-tip pen

Activities:

- 1) Take students on a fall field trip to collect insects or objects of nature.
- 2) Introduce the students to the 3 types of poetry: sijo, haiku and cinquain. Show examples of each to the students.
- 3) Compose an example of each in class.
- 4) Take the students in the school yard and let them scatter out to write a poem following one of the patterns. Encourage the students to write at least one of each type.
- 5) The students will bring their poems back to class to be read orally.
- 6) Encourage the students to select one of their favorite poems to be written and illustrated on black construction paper.
- 7) Review correct manuscript writing with children before they begin their lettering.

Sijo: Korean Poetry Form

- a) Written in 6 short lines each containing 7-8 syllables
- b) 42-48 syllables in the poem

Example: It was very cold out and
We went ice fishing today.
I made a hole and fell in;
I got out and I felt numb;
So I ran home very fast.
All I caught was a bad cold.

Haiku: Japanese Poetry Form (describes a single detail)

Consists of 3 lines: line #1--5 syllables; line #2--7 syllables;
line #3--5 syllables

Example: A little white mouse
Playing upon a sunbeam
Then sliding back down.

Cinquain: French Form

Consists of 5 lines: line #1--2 syllables; line #2--4 syllables;
line #3--6 syllables; line #4--8 syllables; line #5--2 syllables

Example: Music

Psychedelic
Scintillating cool sounds
Groovy, thrilling, sad and happy.
Soul notes.

A function of poetry is to use the minimum number of words to create
a maximum amount of feeling.

Follow-up Activities:

- 1) Encourage children to build a class poetry anthology. All poems written by the children during the year should go into this anthology.
- 2) Display the illustrated poems at a P.T.A. meeting. (Display in a dark hall using the black light.)
- 3) Set up a bulletin board display of the finished poems.

Evaluation:

- 1) Observe the students as they are writing their poetry.
- 2) Have student to hand in a copy of their poems (one of each: sijo, haiku and a cinquain). Check and grade for content and form.
- 3) Use these 3 poetry forms throughout the year.

EXERCISE #2

Title of Lesson: Strip Mining

Behavioral Objectives: At the conclusion of these activities, the student will be able to:

- 1) Define strip mining
- 2) Point out the way strip mining affects man and his surroundings
- 3) Carry on an informative panel discussion
- 4) Discuss the pros and cons of strip mining
- 5) Name at least 12 future uses of the reclaimed stripped area
- 6) Draw some personal conclusion about strip mining
- 7) Write up an observation of what is going on around him

Materials Needed:

- 1) Notebook (keep log of field trip)
- 2) Plywood
- 3) Plaster of paris
- 4) Poster board
- 5) Camera and film
- 6) Tape recorder
- 7) Poster (skills on panel discussion)

Activities:

- 1) Have the students make a display of literature on strip mining (books, charts and newspaper clippings).
- 2) Have students write business letters to the strip mining and reclamation commission for free material and information.
- 3) Present material to students on how to give a panel discussion. Discuss and stress the responsibilities of the panelists and the listeners. Tape a "Meet the Press Show" or an "Issues and Answers Show" to bring in for the class to listen to.
- 4) Help students to make plaster of paris models of: a) area before strip mining, b) area during strip mining, and c) area after reclamation. The students may be broken down in groups to work on these models. Each group would be responsible for presenting an oral presentation on their model.
- 5) Divide the students into groups. Have them to select an area of interest in strip mining. Some of the topics may be: defining strip mining, how it affects man's surroundings, should it be stopped, should it be continued, reclamation, and future uses of stripped areas.
- 6) Discuss with the students how to write up observations of what is going on about them. Have the children to write a brief paragraph describing what is taking place in the class at this moment. (This is in preparation for keeping a log on the field trip.)
- 7) Show slides of strip mining areas before going on field trip. Have the students to ask questions. Discuss the slides.

Follow-up Activities:

- 1) Plan a trip to a strip mining area. If possible, spend a couple of days.
- 2) Show filmstrips "Ecology of Cultivated Areas" and "Minerals and Metals".
- 3) Have a resource person to come to speak to the class: Mr. Earl Thornberry, for example.
- 4) Following the field trip, have the students bring to class the logs that were kept on the trip. Ask the students to read silently their complete log. Start a discussion of some of the logs in class.
- 5) Have the students to bring in the snap shots that were taken on the field trip. (Check to see if snap shots are allowed in these strip mining areas.) Students should prepare a bulletin board and all literature that the students collected in the library for the entire student body to use.

Evaluation:

- 1) Observe the students while giving their panel discussions (make up a check list of panel discussion skills).
- 2) Check over the students' log books to see what kinds of observations were made.
- 3) List ways that strip mining affects the environment of man.
- 4) Name 10 future uses of the reclaimed stripped areas.
- 5) Have students to write an essay on strip mining putting personal views in it.

Reference Materials:

- 1) "Ecology of Cultivated Areas", film, L. Raymer Jones, Route 2 Paris, Kentucky, 40361
- 2) "Minerals and Metals", film, J. Weston Walch, available at the Bourbon County Schools Materials Center
- 3) "Department of Natural Resources Annual Report", leaflet, Division of Reclamation, Department of Natural Resources, Frankfort, Kentucky, 40601
- 4) Progress Report in the Development of Kentucky's Natural Resources, pp. 11-14, Department of Natural Resources, Frankfort, Kentucky, 40601
- 5) "Strip Mining", slides, available at the Bourbon County Schools Materials Center
- 6) "Strip Mining News Clippings", folders 22-b, 22-c, 22-d available at the Bourbon County Schools Materials Center

Resource Persons:

- 1) L. Raymer Jones, Field Representative, Division of Soil and Water Conservation, Route 2, Paris, Kentucky, 40361
- 2) Earl Thornberry, Strip Mining Operator, Route 5, Paris, Kentucky, 40361

4

But: A Story for Our Hands to Tell



This is a plant
So new and small
That it hardly shows
In the moonlight at all----



BUT!



This is a rabbit
Hopping, hopping,
He smells the plant
And now he is stopping----



BUT!



There sits an owl
With great big eyes
He sees the rabbit
And silently flies----



BUT!



Here comes a fox
Not missing a sound
He gets ready to pounce
When the owl strikes the ground----



BUT!

Here comes the farmer
Looking things over
He gives a whistle
To his big dog, Rover----



SO!



The Fox slinks away,
The big Owl goes,
The Rabbit hops home,
The Plant just grows.



..May Theilgoard Watts..



City Dove

There,
On the city street,
Where
People hurry to part or meet,
Where wheels spin and whir and whine,
A dove
Builds her nest in a traffic sign--
A cozy three-story flat,
With lights and heat and a thermostat.

Ranger Rick's Nature Magazine May-June, 1972-Shirley Gordon

Tree Talk

Did you ever stop to think about
What a tree would say
If trees could talk like you and me
In a grown-up way?

Perhaps a tree would sit up tall
And shake its fist at me.
"Do not climb my branches, boy!
You might hurt my knee!"

Oh, how funny it would be
If that willow over there
Said to all the nesting birds,
"You're mussing up my hair!"

Then perhaps a tree would scold
A caterpillar small,
"Go take your walk some other place,
You tickle when you crawl!"

Ranger Rick's Nature Magazine May-June, 1972-Jean Conder Soule

Puzzle and Answer

A mother bird
Brought home a worm
To feed her babies three.
Each baby raised
Its head and said
"Feed me!", "Feed me!", "Feed me!"

The mother bird
Was puzzled how
To feed three mouths one worm.
And while she thought
And thought and thought
The worm began to squirm.

That way and this,
This way and that,
It squirmed until it won.

The puzzle then,
Which mouth to fill,
Was simply answered: "None!"

Ranger Rick's Nature Magazine May-June, 1972-Florence Pedigo Johnson

Yellow-Shafted Flicker

The flicker is a miser
Pocketing his gold--
You can see
How rich is he
When his wings unfold!

Ranger Rick's Nature Magazine May June, 1972-Jeannette Carlberg Kaulfers

FABLES (the following from Childcraft, Vol. 2, 1972 edition)

The Dove and the Ant, Aesop, p. 76
The Hare and the Tortoise, Aesop, p. 78
The Lion and the Mouse, Aesop, p. 80
The Crow and the Pitcher, Aesop, p. 82
The Shepherd Boy and the Wolf, Aesop, p. 76

Tales from Other Lands

Why the Bear Has a Stumpy Tail, p. 234
The Skunk in Tante Odette's Oven, p. 236
The Birds That Could Not Be Seen, p. 252
The Clever Frog, p. 262

Myths and Legends

An Echo and a Flower, p. 290

Poems for Outdoors (Childcraft, Vol. 1)

The Snowbird

When all the ground with snow is white,
The merry snowbird comes,
And hops about with great delight
To find the scattered crumbs.

How glad he seems to get to eat
A piece of cake or bread!
He wears no shoes upon his feet,
Nor hat upon his head.

But happiest is he, I know
Because no cage with bars
Keeps him from walking on the snow
And printing it with stars.

Frank Dempster Sherman

POEMS

(The following from Childcraft, Vol. 1, 1972 edition)

The Sun, p. 79
The Wind, p. 84
The Furry Bear, p. 110
The Kangaroo, p. 111
The Cow, p. 113
Horses, p. 113
Jump or Jiggle, p. 114
Snail, p. 114
The Little Turtle, p. 115
Fuzzy Wuzzy, Creepy Crawly, p. 116
Little Black Bug, p. 116
An Explanation of the Grasshopper, p. 116
The Caterpillar, p. 117
The Cricket, p. 117
Firefly, p. 117
The Beech Tree, p. 122
Trees, p. 122
Queen Anne's Lace, p. 124
Dandelions, p. 125
Smells, p. 150

First Follow Nature (Environmental Awareness, Book 2)

People will go on and on building new—
enviroments and changing the Earth.
Do we want to save the Earth?
Do we want to keep its beauty?
There is a rule we can try to use when
we build. It is the title of this book.

SCIENCE EXERCISE PLANS
Incorporating Environmental Studies

ELEMENTARY SCHOOL LEVEL

Sources Consulted in Developing:

A Curriculum Guide for Nature Study in the Elementary School

Mrs. Marilyn Greulach
Abington School District
Abington, Pennsylvania

Environmental Education: Objectives and Field Activities

Paducah Public Schools
Paducah, Kentucky

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Title of Lesson: The Weather Station

Behavioral Objectives: At the conclusion of this exercise, each student will show that he has some understanding of the function of weather instruments by:

- 1) Reading at least 1 weather instrument at least 3 different times on 3 different days
- 2) Accurately record his findings
- 3) 75% of the class will be able to read and record the weather changes on all the instruments used in weather stations

Materials Needed:

- 1) Weather instruments: ~~anemometer~~, barometer, thermometer, rain gauge, weather vane and hygrometer for measuring the relative humidity
- 2) Large wooden box for housing the weather instruments (these can sometimes be obtained at a factory that makes tools and can sometimes be obtained from the Lexington-Blue Grass Army Depot). If vane is not available, one can be made from scrap pieces of lumber. Students this age can help in this construction.
- 3) Paper for information sheets; for recording weather data and for progress charts

Activities:

- 1) A weather station can be set up, once weather instruments have been made. Some may have to be purchased.
- 2) If a large box cannot be obtained to house the weather instruments, one can be made by the students with some help for the teachers, parents or janitor. The students should help in the planning such as size and dimensions, as well as in the construction.
- 3) The weather station should be set up on the school grounds in an area not used so frequently for other activities. This could be near a fence where wooden fence posts could support some of the instruments while in use, such as the weather vane and anemometer. If possible, stay away from buildings and trees that can obstruct the wind speed.
- 4) Once all work is complete, a schedule can be set up for using the station. This schedule can be planned with other classes so that other children can share in this activity.
- 5) Information sheets can be made and duplicated. These daily sheets should include the date, time, observers, temperature, barometer reading, wind speed, wind direction, humidity, precipitation, cloud type and cloud cover. These sheets can be kept in a notebook for reference. Progress charts can be made for each category so comparisons can be made of daily, weekly, or perhaps monthly changes.
- 6) The class should use their readings to draw up a prediction for the following day. These predictions should be checked for accuracy. The students will enjoy comparing their prediction with that of the local weathermen.

Follow-up Activities:

- 1) A visit to a local weather station should be enjoyable as well as profitable.

- 2) Check the truth behind common sayings connected with the weather. These are some which can be investigated by the children: a) when squirrels lay in a big store of nuts, we look for a hard winter, b) when ants travel in a straight line, expect rain; when ants scatter, expect fair weather, c) the higher the clouds, the better the weather, d) rain before seven, clear before eleven, e) if March comes in like a lion, it will go out like a lamb, f) red sky at night, sailor's delight, red sky in morning, sailor take warning.
- 3) Show film, "The Weather Station".

Evaluation:

At the conclusion of these activities, each student demonstrated his knowledge of weather instruments by:

- 1) Accurately reading at least 1 weather instrument on 3 different occasions.
- 2) Accurately recording his findings.
- 3) 75% of the class accurately read and recorded the readings of all the instruments in our weather station on 1 test given.

Reference Materials:

- 1) "The Weather Station", film
- 2) Free materials on weather from the U.S. Weather Bureau, Washington, D.C.
- 3) Local weather reports from television, radio and newspaper; also, reports on national weather
- 4) Encyclopedia

School Library Reference Materials:

- 1) Rain and Hail, Crowell, '63 unp. illus. by Borten, Helen
- 2) Exploring the Weather, Garden City, '57, 64p. illus. by Hess, Lowell
- 3) Let's Find Out About the Weather, Watts, '67, 59p. illus. by Martin, Rene
- 4) Storms: Their Origins and Effects: Forecasting and Weather Lore, Golden, '66, 58p. illus. by McNaught and Carbe, Nino

EXERCISE #2

Title of Lesson: Weather Instruments

Behavioral Objectives: At the conclusion of these activities, each student should be able to:

- 1) Participate in the making and completion of at least 1 weather instrument
- 2) Each student will measure the weather on 3 different days using the 1 weather instrument he participated in making

Materials Needed:

- 1) Milk bottle
- 2) Balloon
- 3) Thermometer
- 4) Piece of cotton

- 5) Milk straw
- 6) Cardboard
- 7) Scrap pieces of wood
- 8) Cone-shaped paper cups
- 9) Glue
- 10) Nails

Activities:

- 1) In order for students to have a better understanding of how the atmosphere around us is constantly changing, simple weather instruments can be constructed. Upon completion, these instruments can be useful in measuring the weather.
- 2) Teachers should check text and various supplementary science books for directions on making instruments, other than the ones described in this lesson.
- 3) Listed below are instruments that should be included in a weather station. Some ready-made instruments may be on hand or can be purchased while others can be made by the students:
 - a) Air Pressure: Stretch a piece of rubber from a balloon over the top of a milk bottle. Fasten it tightly with rubber bands. Place a strip of glue from the center of the rubber top to the edge. Put the end of a paper drinking straw horizontally on the glue. Hold it firmly there until the glue dries. Place the bottle near a piece of cardboard and with a black crayon, mark the board exactly where the end of the straw comes. When the air pressure increases, the rubber on the bottle pushes down and the end of the straw will move up. When the pressure decreases, the rubber will bulge slightly and the end of the straw will move down. When the pointer points higher on the board, the pressure is greater. When the pointer points lower on the board, the pressure is lower.
 - b) Humidity: Roll a piece of wet cotton around the bulb of a regular thermometer and let it hang in water. Put it near a regular dry thermometer. When the humidity is high, there is less difference in the 2 readings. When the temperature is the same, there is 100% humidity.
 - c) Wind Direction: Cut a piece of cardboard in the shape of an arrow. Drive a nail vertically through the center of arrow and into the end of a piece of wood that is approximately 2"x2" and any length desired. A large bead could be placed between the bottom of the arrow and the top of the piece of wood with the nail going through the hole in the bead. This will keep the arrow from bending on the wood, enabling the arrow to move freely as the wind pushes against it. The arrow will point toward the direction from which the wind is blowing.
 - d) Wind Speed: A simple anemometer can be made by tacking or gluing cone-shaped paper cups on a cross piece of wood. Tack this cross piece of wood to the end of vertical rod. As the cups turn in the wind, they turn the axle. The number of times a second the axle revolves, is a measure of the wind's speed.

To determine the approximate speed of wind, the "Beaufort Wind Scale" can be used.

MPH (miles per hour)

Less than 1, smoke rises vertically

1-3 direction shown by smoke

4-8 Leaves rustle, vane moved by wind

9-12 Leaves and twigs in constant motion

13-18 Raises dust and paper

19-24 Small trees sway

25-31 Large branches move

32-38 Whole tree moves

39-46 Twigs break off trees

47-54 Light storm damage

55-63 Trees uprooted

64-75 Widespread damage

75- Evacuate to safe surroundings

e) Temperature: A regular Fahrenheit thermometer is used to measure the temperature.

f) Precipitation: A rain gauge is used to measure the amount of rainfall in inches or fractions of inches. They are inexpensive and are sometimes given away by business firms as advertisement. A slender jar can also be used. It should be the same size at the top as at the bottom. The rainfall can be measured by placing a ruler at the side of the jar.

Follow-up Activities:

After weather instruments have been made, a weather station should be set up outdoors, affording the students the opportunity to measure the weather. A lesson on setting up "The Weather Station" is in the next lesson.

Evaluation:

Each student:

- 1) Participated in the making of at least 1 instrument designed for measuring weather.
- 2) Demonstrated his understanding of the function of the instrument he helped to make by using it for measuring the weather on 3 different days.

Reference Materials:

- 1) Free bulletins on the weather can be obtained upon request from the U.S. Weather Bureau, Washington, D.C.
- 2) Check teacher magazines and school supply catalogs for inexpensive kits and booklets on teaching a weather unit. These will contain information on other ways of making various weather instruments.

School Library Reference Materials:

- 1) Everybody's Weather, rev., Lippincott, '57, 96p. illus, Gaer, Joseph
- 2) Junior Science Book of Rain, Hail, Sleet and Snow, Garrard, '61, 62p. illus. by Weda Yap, author, Larrick, Nancy
- 3) Everyday Weather and How It Works, Herman, Schneider, rev., McGraw, '61, 194p. illus. by Jeanne Bendick
- 4) What Is Weather?, Benefic, '60, 45p. illus. by William Tanis

EXERCISE #3

Title of Lesson: Bird Feeders

Behavioral Objectives: At the conclusion of this exercise, each student:

- 1) Will have participated in the making of at least 1 bird feeder
- 2) Will have assumed the responsibility of feeding the birds on at least 1 occasion

Materials Needed:

- 1) Mesh onion bags
- 2) String or fine wire
- 3) Scraps of wood
- 4) Twigs
- 5) Pine cones
- 6) Discarded garbage can lids
- 7) Discarded hub caps
- 8) Glue
- 9) Coconut
- 10) Various food items such as grain, seeds, bread crumbs, popcorn, suet, peanut butter, apples, nuts and cereal

Activities:

- 1) To encourage more birds to become permanent residents in our locality and in order to study their habits and preferences, students can make simple and inexpensive bird feeders.
- 2) By placing these feeders in a quieter area of the school grounds and keeping them stocked with food, especially in the winter months, the students can learn a responsibility for the welfare of life.
- 3) Listed below are descriptions of bird feeders which the children can make:
 - a) A suet bag can easily be made from a mesh onion bag or potato bag. Suet is placed in the bag, the bag is tied and hung from a tree limb.
 - b) Pieces of logs make good holders. Drill holes in the log and fill suet, peanut butter or seeds. These can be seeds of weeds which the children can gather from fields or woods near home.
 - c) Make small holes in a square piece of wood large enough so that twigs can be placed in them. Select twigs of about the same length and glue the ends of the twigs in the holes. Place bread crumbs, suet or grain inside and tie the end of the twigs together so the container resembles a teepee. This affords protection for the birds while feeding.
 - d) Cut a V-shape in a coconut. Leave the meat of the coconut intact and place a screw eye in the top of the shell. Hang on a tree limb. When the meat of the coconut is gone, other foods can be placed inside.
 - e) Collect some pine cones. Mix suet and peanut butter together and rub the mixture into the cover. Tie a string around the tops and hang.
 - f) Make a winter pie for the birds. Put 2 cups of oatmeal in 4 cups of water for 2 minutes. Add 1 pound of lard and 1, 12-ounce jar of peanut butter. Remove this from heat and add 3½ cups of

oatmeal, corn meal or cream-of-wheat. Knead this mixture thoroughly and fill pot pie containers (aluminum). Before the mixture hardens, trim the edges of the pies with evergreen twigs. Insert a short dowel rod or twig so the bird will have a perching stick while eating. These can be hung on trees when finished or frozen for later use.

- 4) There will be some expense involved in the making of some of the above items. Perhaps some of the students will be able to bring some of these items from home. Also, they may want to save pennies in order that some items can be bought. These experiences can be shared with other grades and they can bear some of the expense and perhaps take turns supplying the food for the feeders.
- 5) Left-over food scraps from home or the lunchroom can be used such as stale bread, doughnuts or cake, cereal, apples, raisins and nuts.

Follow-up Activities:

- 1) Decorate a tree on the school grounds as a holiday project. The children can decorate with strings of popcorn or small containers of grain or other seeds.
- 2) Students might like to add bird baths to the area. Simple ones can be made from old garbage can lids or hub caps, nails to the top of a post. The bath should contain several to provide a safe foothold for the birds. They should be kept clean and filled, once they're erected.
- 3) Simple bird houses can be made and hung in the trees to help protect some wintering birds. These can be made from large milk cartons and gallon plastic bleach bottles.

Evaluation:

Each student:

- 1) Participated in the making of at least 1 bird feeder.
- 2) Assumed the responsibility of feeding the birds on at least 1 occasion.

As a follow-up activity later in the year and through his own observations of the bird feeding at the feeders, each student a) identified at least 2 birds observed, b) used 3 adjectives in describing the 2 birds identified, and c) stated the preference of food of the 2 birds identified.

Reference Materials:

- 1) "Birds in Winter", film
- 2) "Birds", chart by Talman, Federal Savings and Loan Association, available at the Bourbon County Schools Materials Center
- 3) "Birds and Other Animals", by National Audubon Society, available at the Bourbon County Schools Materials Center
- 4) "Birds In Our Backyard", filmstrip
- 5) Audubon Bird Study Program, teaching kit, available at the Bourbon County Schools Materials Center

School Library Reference Materials:

- 1) Bird Watchers and Bird Feeders, by Blough, Glenn O., McGraw, '63, 48p. illus. by Bendick, James

- 2) Birds Eat and Eat and Eat, Crowell, '63, unp. illus. by Emberley, Ed
- 3) My Hobby Is Bird Watching, Children's, '58, 128p. illus.
- 4) Free materials from Garden Club of America, Conservation Committee, 598 Madison Avenue, New York, New York

EXERCISE #4

Title of Lesson: Winter Tree Identification

Behavioral Objectives: After completion of these investigations, the students will:

- 1) Identify at least 5 trees observed and investigated on school grounds by shape, bark and leaf scars
- 2) Tell the approximate age of a given tree by counting the rings of a cross-section specimen
- 3) At least 80% of the students will show, by drawing, the transportation of water and minerals through a tree from roots, through trunk, limbs and leaves

Materials Needed:

- 1) Hand lens
- 2) Paper and pencil for recording
- 3) Cross-section of tree stump (possibly several)
- 4) Piece of celery (for experiment)
- 5) Vegetable coloring (food)
- 6) White flower such as Queen Anne's Lace or Carnation

Activities:

- 1) Although leaves are very frequently used as means of tree identification, winter affords a good time to identify trees by their shape, bark and leaf scars.
- 2) As children observe the leaf scars of trees in the school yard or nearby, they will see dots, which are small tubes that make up the transportation system of the tree. Through these, water and minerals are carried to the different parts of the tree. A hand lens should be used to observe these scars. The pattern of scars varies with each kind of tree. The Ash scar looks a bit like a slice of watermelon while the Maple scar resembles a grinning cat.
- 3) Observe the circles or rings around the twigs at intervals. These are scale scars and show where buds have opened, cast off their scales, and left these scars. The distance between 2 circles of scale scars on a twig will be the growth of the twig in one year. Here, the age of the entire twig can be determined.
- 4) Shapes of trees in winter are sometimes very distinct. Most Evergreens are shaped like a pyramid or triangle; the Elm has the shape of a spraying fountain; the Cedar resembles an ear of corn, while a Hickory is shaped like a peanut.
- 5) Some trees grow winter buds. Look for these and observe through a hand lens.

- 6) If there are no fallen trees or tree stumps in the area, perhaps one or more cross-sections can be brought in for classroom study. A parent, highway department or local utilities company might be able to supply these. In studying a cross-section, observe the following:
 - a) Look at the rings of the cross-section. The dark rings indicate fall-winter growth while the lighter rings show the spring-summer growth.
 - b) Observe the widths of the rings. Large widths indicate good growth years with ample rain and sun and little or no pest problems. Incomplete rings can show evidence of fire or pest damage. Rings of narrow width could have been caused by droughts, short warm seasons or pest problems.
 - c) Evidence that a tree leaned in one direction can be seen if the rings are elliptical and are narrow at one side and wide at the other.
 - d) Count the annual rings to determine the approximate age of the tree. Each dark ring stands for 1 year and the solid core in the middle represents 10 years of growth.
 - e) Compare the rate of growth of all cross-sections studied.

Follow-up Activities:

- 1) To demonstrate how tube bundles carry water and minerals to different parts of the plant, put a piece of celery in a glass of water containing red food coloring. Eventually, the color will move up the stalk and into the veins of the leaves. Cut a cross-section of the stalk and look at the red dots or tubes.
- 2) To show that water is carried to the flowers of a plant, place a white flower, such as a Carnation or Queen Anne's Lace (in season) with stem attached, in a glass of colored water. The flower will become colored in a few hours.
- 3) In the spring, select a plant. Look at the petiole, which is the stem that joins the broad green part of the leaf to the stem of the plant. Cut the petiole near the base of the leaf. A drop of liquid may ooze out; a clue that the petiole has been transporting liquid in and out of the leaf.

Evaluation:

After the completion of investigations of 7 kinds of trees on the school ground, the students:

- 1) Can identify 5 trees by their shape, bark and leaf scars.
- 2) Can give the approximate age of a given tree by counting the rings on a cross-section specimen.
- 3) 80% of the students can show, by drawing, the transportation of water and minerals through a tree from roots, through trunk, limbs and leaves.

Reference Materials:

- 1) Audubon Tree Study Program, teaching kit, available at the Bourbon County Schools Materials Center
- 2) Audubon Plant Study Program, teaching kit, available at the Bourbon County Schools Materials Center

- 3) "Forest and Trees of the U.S.", by American Forest Institute, chart, available at the Bourbon County Schools Materials Center
- 4) "Trees and Plants", by National Audubon Society, chart
- 5) "Experiments in the World of Plants", Part II, by Jewel Aquarium Company, Inc., available at the Bourbon County Schools Materials Center
- 6) "Forest Resources", by J. Weston Walch, slides, available at the Bourbon County Schools Materials Center

School Library Reference Materials:

- 1) Knowing Your Trees, Collingwood, G. H. and Brush, W. D., rev. and enl., American Forestry Association, '64, 349p. illu.
- 2) First Book of Trees, by Cormack, M. B., Watts, '51, 93p. illus. by Carter, Helene
- 3) Field Guide to Trees and Shrubs, Petrides, George A., Houghton, '58, 431p. illus. by Peterson, Tory and author
- 4) Play With Trees, Morrow, '50, 64p. illus. by Scherer, Fred F.
- 5) Trees: A Guide to Familiar American Trees, rev., Golden Press, '56, 160p. illus. by Barlowe, Dorothy and Sy

EXERCISE #5

Title of Lesson: What Good Are Insects?

Behavioral Objectives: At the conclusion of these activities, the students will be able to:

- 1) Name the 3 basic characteristics that determine an insect
- 2) Identify 8 insects in their immediate environment
- 3) Name 1 insect from each of these categories: pollinators, scavengers, soil conditioners and manufacturers

Materials Needed:

- 1) Hand lens
- 2) Insect cages. These can easily be made from oatmeal boxes using the lid and the bottom of the box (about 1 inch high). Measure, cut and roll the screen wire to fit. This roll of screen wire can be sewed up the side with coarse thread. Fit roll into bottom of oatmeal box and place lid on top. The bottom should be lined with aluminum foil and place a piece of wet cotton inside for moisture for the insect.

Activities:

- 1) These activities should take place after a study of insects has been made in the classroom and children already have learned how to identify an insect.
- 2) Set up, before the class, these and other questions: a) What good are insects?, b) Could man survive without them? A trip to the school yard as a class and individually to the area around the homes of the children might enable the class to answer with more certainty.

- 3) Look for examples of these categories while on nature walk and discuss each:
 - a) Pollinators: How necessary are insects to cross-pollination, especially honey bees? What foods might we not have if there were no insects to pollinate? Would we have cover crops to prevent erosion without the help of insects?
 - b) Soil Conditioners: What insects burrow in the soil? How does this burrowing and digging help the soil and plants?
 - c) Scavengers: What evidence do you see of insects breaking down decaying stumps or logs? How does this help the soil? How are insects and dead animals related?
 - d) Manufacturers: What about the use of insects to make dyes, resin, silk and honey? What insects are used in manufacturing and what are the end products?
 - e) Food: What animals, including man, use insects for food? How birds be affected by the disappearance of insects? What about our fish, frog and turtle population?
- 4) Whenever possible, on the nature walk, give children the opportunity of observing the insects closely with a hand lens, enabling them to count the 6 legs, 3 parts to the body and the 2 antennae.
- 5) A few specimen could be taken back to the classroom for closer observation. The homemade insect cages should be used for this, making sure the children know beforehand how to care for them. They should be turned loose in a few days.

Follow-up Activities:

- 1) Encourage children to look for insects around their yards and fields near their homes.
- 2) Reports could be made of the kinds observed and what they were doing. Can they place them in the right category such as pollinators, scavengers, etc?
- 3) Bring in the concept of ecology. An entire unit can be built around the balance of nature and the placement of plants and animals in the scheme.

Evaluation:

- 1) Can the children name the 3 basic characteristics that determine an insect (3 body parts, 2 antennae and 6 legs)?
- 2) Can the children identify 8 insects in the immediate environment?
- 3) Can the children name 1 insect from each of these categories: pollinators, scavengers, soil conditioners and manufacturers?

Reference Materials:

- 1) Excellent teacher sources for background information are:
 - a) "What Good Are Insects", Audubon Nature Bulletin
 - b) "How Insects Benefit Man", Audubon Nature Bulletin
 - c) The Question and Answer Book of Insects (also for children)
 - d) Audubon Ecology Study Program, available at the Bourbon County Schools Materials Center
 - e) "Life Cycle of the Monarch Butterfly", filmstrip, available at the Bourbon County Schools Materials Center
- 2) "Nature's Half Acre", film

School Library Reference Materials:

- 1) Free material from Garden Club of America, Conservation Committee, 598 Madison Avenue, New York, New York
- 2) Familiar Insects of America, Harper, '60, 236p. illus. by Burger, Carl and Lloyd, Nancy
- 3) Insects and Plants, Day, '62, 48p. illus.
- 4) Ladybug, Ladybug, Fly Away Home, Growell, '67, unp. illus. by Emberley, Ed
- 5) Bug Book, Golden, '65, unp.
- 6) Let's Look at Insects, Doubleday, '69, 60p. illus. by the author
- 7) When Insects are Babies, Holiday, '69, unp. illus. by Marokvia, Arthur

EXERCISE #6

Title of Lesson: Bird Identification

Behavioral Objectives: At the conclusion of these activities, each student should be able to:

- 1) Identify at least 6 birds common to our locality
- 2) Use 3 adjectives in describing each of the 6 birds identified
- 3) Name at least 4 migratory and 4 wintering birds in our immediate environment

Materials Needed:

- 1) Charts for recording a description of each bird seen
- 2) Pencils
- 3) Noise-making devices to encourage responses from birds
- 4) Records (recordings of bird calls)

Activities:

- 1) As part of a study of birds that has been done in the classroom, plan a nature walk to the school yard or surrounding area.
- 2) Before going on walk, listen to recordings of bird calls.
- 3) Discuss listening as a valuable aid in bird identification.
- 4) In preparing for outdoor walk, make a device (several) to encourage responses from birds in the area. Cut a piece of hard wood that is 1 inch square into 2 inch length. Drill hole in one end slightly larger than screw eye to be used. Put resin powder in the hole. As the screw eye is twisted, sounds, resembling chirps and trills, can be produced by the wood vibrations.
- 5) Charts can be very helpful aids in recording information on birds seen in the area.
- 6) Some of the topic headings for the charts are described below. These can be made by the children or copies made by the teacher:
 - a) Size: Compare the bird with standard measure. Is it larger or smaller than a sparrow (6 inches), a robin (10 inches) or a crow (20 inches)?
 - b) Color: What general color is the body? Are there special markings on the throat, belly, wings or tail?
 - c) Shape: Note the body shape as well as the head, bill, tail, wing and leg.

- d) Location: Was the bird in flight, in a tree top, near on on water, in an open field or on a fence?
- e) Sweep: Was the flight jerky, darting, swooping, irregular or smooth?
- f) Did you hear a chirp or trill? Can you mimic the call?
- g) Can you now name the bird?
- 7) Language Arts naturally come to the front when making recordings on the nature walk. Adjectives can be sought and discussed in class to help in descriptions. Words such as plump, sleek, streamlined, thick, rounded, square, notched, pointed, ragged, jerky, swooping, gliding and stubby can be useful adjectives.

Follow-up Activities:

- 1) Research and reports can be made on individual birds, both for identification and background. Consider such things as bird's use to man, migratory patterns, feeding and living habits.
- 2) The life of Audubon and his pictures can provide a worthwhile activity. Also, discuss the Audubon Society.
- 3) Sketches of birds can be done as creative art.
- 4) Children, with help of teacher, can make an electric quiz board or box.
- 5) Make a study of the eagle, with emphasis on the bald eagle, our national bird.
- 6) Your conservation officer or a member of the Audubon Society could be asked to visit the class.

Evaluation:

- 1) Can the children identify at least 6 birds common to our locality?
- 2) Can they use 3 adjectives in describing each of the 6 birds identified?
- 3) Can they name at least 4 migratory and 4 wintering birds in our immediate environment?

Reference Materials:

- 1) "Birds of the Forest", film
- 2) "Birds and Other Animals", chart, National Audubon Society, available at the Bourbon County Schools Materials Center
- 3) "Birds Songs in Your Garden" and "Songbirds of America", records, Houghton-Mifflin Company, available at the Bourbon County Schools Materials Center
- 4) Audubon Bird Study Program, kit, available at the Bourbon County Schools Materials Center

School Library Reference Materials:

- 1) Giant Golden Book of Birds, Golden Press, '62, 97p. illus. by Singer, Arthur
- 2) Birds of America, Macmillan, '53
- 3) If I Were a Bird, Holiday, '65 unp. illus. by Marokvia, Arthur
- 4) Field Guide to the Birds, rev. and enl., Houghton, '47, 290p. illus. by the author
- 5) My Hobby is Bird Watching, Children's, '58, 128p. illus.

- 6) Tony's Birds, Harper, '61, 64p. illus. by Werth, Kurt
- 7) Birds: A Guide to the Most Familiar American Birds, rev., Golden, '56, 160p. illus.
- 8) Materials available from National Wildlife Federation, Educational Services, 1412 Sixteenth Street, N.W., Washington, D.C.
- 9) Free materials from Kansas Forestry, Fish and Game Commission Information, Education Division, Box 1028, Pratt, Kansas

SCIENCE EXERCISE PLANS
Incorporating Environmental Studies

ELEMENTARY SCHOOL LEVEL

Compiled by:

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Title of Lesson: Clay

Behavioral Objectives: At the conclusion of these activities, students will be able to:

- 1) Identify products made from clay and arrange a display including several objects representing categories of use
- 2) Discuss the importance of clay as a useful natural resource and as a major economic influence
- 3) Identify the types of clay found in Kentucky and relate the several products for which they are used
- 4) Construct decorative objects and replicas of structural items from clay
- 5) Describe some of the methods and processes used in producing commercial decorative items from clay

Materials Needed:

- 1) Objects for display of clay products
- 2) Quantity of white clay (kaolin) for student projects
- 3) Samples of potters clay
- 4) Sand for mixing with kaolin to show how fire clay is made
- 5) Water supply
- 6) Containers (large tin cans and plastic bottles to mix and store slip)
- 7) Straw
- 8) Small supply of easily worked wood, such as pine, for constructing molds and making decorating tools
- 9) Small modeling tools, bits of wire, spoons, table knives, etc.

Activities:

- 1) Discuss the importance of clay in our everyday life. Have the students prepare a list of all the things that they can think of that are made of clay. Ask for volunteers to bring several articles made from clay. Arrange these in a display, dividing them into categories such as construction materials, those used only for decoration and functional materials.
- 2) Point out that Kentucky produces clay which is used for common brick, tile, portland cement, rock wool, fire brick, chinaware, pottery, in refining oil and in making paper.
- 3) As a "hands on" activity, the students will enjoy making small decorative articles such as small dishes, trays, figures and paper weights. If red clay is available, some students may choose to design small replicas of structural items such as bricks, tiles, sewer pipe, etc.
 - a) Demonstrate methods of design and construction, such as molding, modeling, cutting and extruding.
 - b) Parts of objects can be welded by wetting surfaces and using slip (liquid clay) as a bonding agent.
 - c) Designs can be incorporated into clay surface while soft or after it is set up, using small, carving tools, sharpened sticks such as tongue depressors, hairpins, etc.
 - d) If a kiln is available (such as in some secondary school art departments) the articles may be fired. If not, the articles will dry out within several days and the projects can be enameled. In any event, the teacher will want to discuss the reasons for kiln firing, finishes and glazes.

EXERCISE #1 (cont.)

44

- 4) As a cooperative class activity, students could produce small building bricks from clay, straw and water to be used in social studies projects for constructing facts, bridges, walls and buildings. Molds would be constructed from pine, either by students or teachers.

Follow-up Activities:

A trip to a place to observe the production of decorative clay product would be a valuable experience.

Evaluation:

Each student:

- 1) Examined items made from clay.
- 2) Participated in class discussion of clay production and its uses.
- 3) Recognized the difference between kaolin and red clay.
- 4) Participated in creating objects made from clay.

Reference Materials:

- 1) Young People's Science Encyclopedia, National College of Education, vol. 4, Children's Press, Inc., Chicago, Illinois, 1964
- 2) Geography of Kentucky, Schwendeman, Joseph R., Harlow Publishing Corp., Norman, Oklahoma, 1963
- 3) Make and Do, Childcraft, vol. II

EXERCISE #2

Title of Lesson: Coal

Behavioral Objectives: At the conclusion of these activities, students will be able to:

- 1) Distinguish 2 kinds of coal
- 2) List 2 direct industrial uses of coal
- 3) Identify 3 coal by-products
- 4) List 2 methods of mining coal
- 5) List 3 pollution dangers caused by coal mining

Materials Needed:

- 1) Samples of bituminous (soft) coal and anthracite (hard) coal
- 2) Small supply of bituminous coal (1 lb.) for experiments
- 3) Samples of coke, coal tar, peat and sulfur
- 4) Heat source: gas burner or LP gas torch
- 5) Metal stand for holding containers being heated
- 6) Shallow tin can
- 7) Pair of gloves
- 8) Safety tongs
- 9) Flask or flame-proof bottle with cap or device designed or punctured to emit gas
- 10) U.S. and Kentucky maps showing regional deposits and/or production charts showing economic significance

Activities:

- 1) The teacher can prepare students for this lesson by having them list and discuss all people they may know who earn a living based on Kentucky's coal industry: a) relatives and family friends, b) miners, equipment operators, repairmen, truck drivers, secretaries, etc.
- 2) Many references are available from the U.S. Bureau of Mines, United Mine Workers, mining companies, Tennessee Valley Authority, state departments of natural resources, etc.
- 3) During class investigation and discussion of the following outlined material, students should examine samples of coal, coke, peat, coal tar and sulfur:
 - a) The most abundant of the world's fuel resources, coal is a fossil fuel formed in swamps during the "carboniferous" period from vegetable matter having been subjected to structural changes and great pressures. This squeezing effect expelled the oxygen, nitrogen and hydrogen from the plant matter leaving the rich carbon deposit.
 - b) Other elements are present in coal such as sulfur, silica, aluminum and magnesia. When burned or processed, the sulfur is generally expelled in a gaseous form; however, the other elements form ashes and clinkers.
 - c) The geologic formation of coal evolves in the following sequence:

Peat: soft, almost spongy vegetable mass. Used for fuel, but has low heat value.

Semi-Lignite: soft, brown vegetable mass that is more compacted than peat. Burns with much smoke and ash, but has low heat value.

Lignite: brown to light black in color, easily breakable. Burns with much smoke and ash and has low heat value.

Cannel Coal: compact and hard, it is used for fuel, but does not have a high enough heat value for commercial use.

Bituminous Coal: most important variety of all coal. It is black, soft and brittle. Widely used for steam production in heating plants and power plants and for home heating. After burning, less than 10% volume remains as ash. Important by-products from heating in closed oven includes: coke, coal gas, coal tar and ammonia. Valuable distillates include: naphthalene, phenol, plastic bases, drugs, dyes, creosote, fibers, oils and acids. Chief mining areas are West Virginia, Pennsylvania, Kentucky, Illinois, Ohio, Indiana, Alabama and Virginia.

Anthracite: hard, black with maximum carbon content. Burns with blue flame and highest heat value. Chiefly found in Wales and Belgium. In the United States, Pennsylvania's annual production is over 60,000,000 tons.
- 4) Teachers can demonstrate production of coal by-products on a small scale. The room should be well lighted and ventilated. Students should be seated or standing at a safe distance while observing:

Coal Tar: crush bituminous coal into small bits (pea size is suitable). Heat the crushed coal in a shallow tin can until black, sticky tar bubbles from it. Caution students to avoid breathing escaping fumes. Explain that the solid remaining residue is coke and is used extensively in blast furnaces for iron and steel production.

Coal Gas: place crushed bituminous coal in flame proof glass container (flask) with a small opening in lid. Heat the container until gas is produced. The coal gas can be ignited at the opening in the cap of the container. To reduce the amount of gas being produced,

remove the heat source. This experiment should be observed from behind a viewing shield. The teacher should wear an apron, a face shield and gloves. A metal container can be substituted for the glass flask.

- 5) A discussion of mining methods should be conducted, pointing out the economic benefits of both shaft and strip mining. It is important to discuss environmental and human safety hazards: a) careless shaft mining operations can pollute streams, destroy vegetation, poison wildlife and destroy human life, b) irresponsible strip mining operations ruins farm land, wastes forever valuable topsoil, causes erosion and leaves ugly, barren waste lands.

Follow-up Activities:

It is suggested that a representative from a department of natural resources visit the students to present modern films and/or lead discussions dealing with coal mining and environmental issues. The students can prepare charts and maps showing production areas. Photographs of reclaimed strip areas should be displayed. Students can write letters of inquiry to mining companies, U.S. Bureau of Mines, and interesting pictorially, illustrated charts showing coal products can be prepared.

Evaluation:

Each student:

- 1) Recognized samples of 2 kinds of coal.
- 2) Listed 3 coal by-products.
- 3) Participated in discussing uses of coal and methods of mining.
- 4) Recalled 3 pollution dangers associated with coal mining.

Reference Materials:

- 1) World Book Encyclopedia
- 2) Young People's Science Encyclopedia, National College of Education, vol 5, Children's Press, Inc., Chicago, Illinois, 196

EXERCISE #3

Title of Lesson: Forestry Products

Behavioral Objectives: At the conclusion of these activities, students will be able to:

- 1) Identify many common everyday items that are produced from forest products
- 2) Prepare a visual display relating specific kinds of hardwoods and softwoods to useful products
- 3) Describe how pulp is produced and used in making paper
- 4) Discuss the production and uses of charcoal
- 5) Relate the importance of proper forest management to conservation practices involving soil protection, wildlife protection, timber protection, fire prevention and recreational activities

Materials Needed:

- 1) Samples of various cross cut sections from both hardwood and softwood trees
- 2) Yarn
- 3) Pictures of various forest products
- 4) Paper making frame
- 5) Linen cloth
- 6) Liquid starch
- 7) Iron
- 8) Charcoal
- 9) Drawing charcoal sticks

Activities:

- 1) The teacher can begin this lesson by having students list and bring in samples of familiar items (small portable things) that are produced from forest products. Some of these are paper products, veneer, charcoal as well as traditional wooden products.
- 2) Obtain specimen of different trees, cut a cross cut section from each different type: mount these on a chart or bulletin board, labeling each. From each specimen, run yarn to pictures of products that are made from these samples. This would make an attractive display that could involve total class participation.
- 3) Discuss the importance of paper in our daily lives. Delve into the history of paper by developing a chart, having children research these facts:
 - a) Paper, as a name, originated with Egyptians, who wrote on flattened and glued layers of the thick papyrus reed which they attached to rods and rolled.
 - b) Real paper was invented by the Chinese about 105 A.D. Ts'ai Lun, a court official, made the pulp from mulberry bark and bits of cloth and hemp mashed in water.
 - c) About 650 years later, invading Arabs forced Chinese prisoners to tell the secret of paper making. The knowledge spread to Europe by the 12th Century.
 - d) Paper was first made (using rags) in North America at Germantown, Pennsylvania in 1690 by William Rittenhouse.
 - e) Early in the 1700's, a Frenchman named Reaumer, watched wasps chew wood and use the moistened fibers to build "paper" nests. Later, machinery and chemicals were invented to "digest" wood chips to make the process practical and economical.
- 4) Make paper in the classroom. For elementary classes, it is not practical to attempt to use wood fibers, but rags are suitable because the process can be simplified so that chemicals are not involved. Have children separate the threads in clean, linen rags. Boil these for several hours in a quantity of water. Add more water to make pulp float freely before adding liquid starch until mixture is cloudy. The paper-making mold is a 9"x6½"x1" wooden frame with an 8"x5½" fine mesh copper wire screen nailed to the bottom. The hollow deckle or forming tray which fits over the mold has outside dimensions of 10"x7½"x1" and inside measurements of 9"x6½" (see illustration). To form paper, dip the mold and deckle deep into the water. Agitate frames slightly from side to side to spread fibers evenly over the wire screen. Tip sides and ends to drain off excess water and shake mold gently to "felt" the fibers. Remove

surplus pulp that sticks between deckle edge and mold. Turn the "paper" carefully onto flannel cut about 2 inches wider than the wire screen. Cover with a second piece. Use an iron for the entire drying process.

- 5) Discuss charcoal: having students describe the uses. Point out that other than fuel, charcoal is used to remove odors from the air, as a filtering device for water (as in an aquarium) and as an artist's tool. Have charcoal sticks available and allow students to make charcoal sketches. After becoming familiar with this art media, perhaps sketches could be made using the paper you have made.
- 6) After the uses of forest products have been investigated, discuss the importance of forestry to conservation, wildlife and recreation:
 - a) Conservation: Trees help to conserve soil--a) tree limbs and leaves break the fall of rain drops, causing them to fall with less force, b) fallen leaves form a mulch which protects the soil from erosion, c) tree roots hold particles of soil together. Trees help conserve water--a) a higher percentage of the fallen trees soak into the soil on forested areas rather than on cleared areas, b) the leaf humus cover prevents the water from evaporating from the soil.
 - b) Wildlife and Recreation: a) trees are the natural habitat of many species of wildlife, b) trees are necessary for outdoor recreational facilities because of their beauty as well as the practical purposes of shielding us from the sun by providing shade.
- 7) The dangers to our forest lands should be discussed and ideas for prevention examined:
 - a) Fire: the most spectacular killer.
 - b) Insects: the silent killers.
 - c) Disease: the hidden killer.
 - d) Other: Livestock--a) cattle, goats, horses and sheep browse the young seedlings and trample them down, yet they get little feed value from grazing the forests, b) hogs eat the seeds, root out seedlings and injure the bark of certain trees.
 - e) Certain Wildlife: a) deer--excessive numbers can harm the forests, b) rabbits--over-population will cause them to eat the bark of young seedlings for food.
 - f) Weather: a) lightning strikes causing fire and destroying forests, b) wind storms break limbs from trees and uproot trees damaging seedlings.

Follow-up Activities:

Prepare maps of Kentucky showing areas of major timber growth. Contact the Kentucky Bureau of Natural Resources and arrange for personnel to visit your school to present a topic on forest management. Prepare a list of Kentucky businesses that engage in forest cutting operations and write letter of inquiry regarding cutting practices, products, where products are marketed and what practices are conducted for reforestation.

Evaluation:

Each student:

- 1) Examined items made from forest products.
- 2) Participated in creating or viewed classroom display of kinds of woods and related products.
- 3) Viewed samples of wood pulp and participated in a paper making experiment.

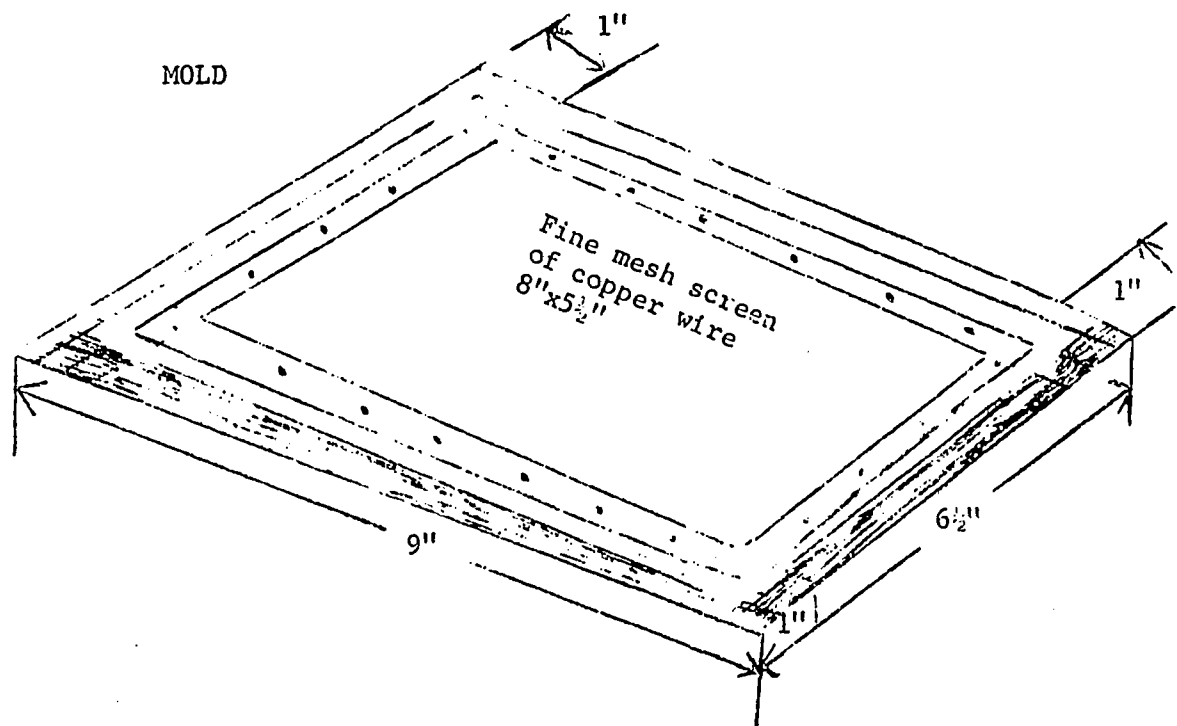
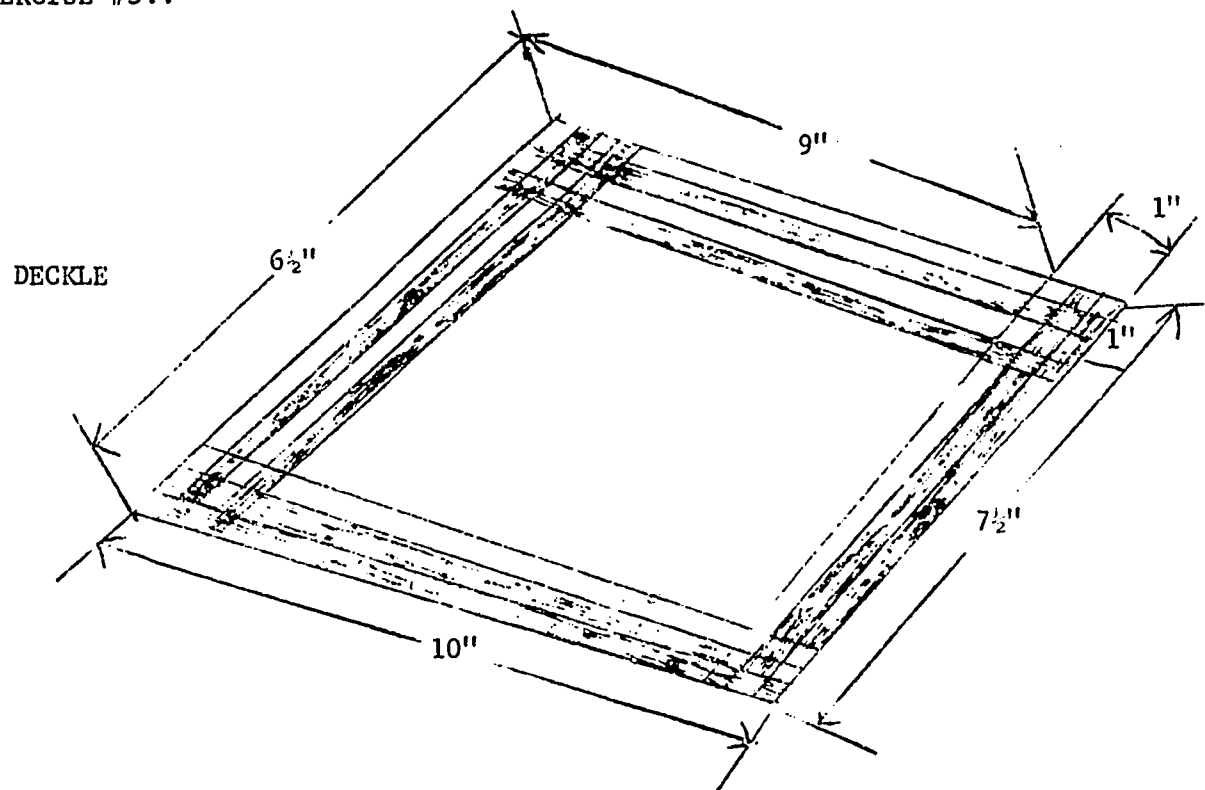
- 4) Participated in class discussion of charcoal production and uses.
- 5) Participated in classroom discussion on forest management.

Reference Materials:

- 1) "The Story of Pulp and Paper", pamphlet, American Forest Products Industries, Inc., 1968, available at the Bourbon County Schools Materials Center
- 2) "The Life of the Forest", pamphlet, St. Regis Paper Co., available at the Bourbon County Schools Materials Center
- 3) "Forestry", course of study prepared by Robert Spillman, Instructional Materials Laboratory, Department of Vocational Education University of Kentucky, pamphlet, April, 1969
- 4) "Fifth Graders Explore Ways to Make Paper", article, Mary Margaret Authier, Instructor, May, 1968
- 5) Geography of Kentucky, Schwendeman, Joseph R., Harlow Publishing Corporation, Norman, Oklahoma, 1963
- 6) "Changing Forests", color film, 19 min., Consulate General of Canada
- 7) "Endless Forest" color film, 28 min., #3043, Modern Talking Pictures
- 8) "From Trees to Lumber", black/white film, 14 min., L. Raymer Jones
- 9) "A Fire Called Jeremiah", color film, 48 min., U. S. Forestry Service

..EXERCISE #3..

50



Title of Lesson: Insects

Behavioral Objectives: At the conclusion of these activities, students will be able to:

- 1) Construct habitats to be used for observing insect life
- 2) Identify several insect species
- 3) Maintain insects for live observation
- 4) Describe the effects of environmental change on insects
- 5) Discuss the habits and activities of several insects
- 6) Describe the habits of colonized bees and ants such as feeding, working, breeding and protecting
- 7) Construct replicas of insects from modeling dough
- 8) Design 3-dimensional scenes showing insects in natural-like settings
- 9) Write reports concerning the habits science, control, benefits, dangers and species of insects

Materials Needed:

- 1) Plastic milk cartons
- 2) Masking tape
- 3) Plastic wrap
- 4) Fine screen
- 5) Coffee can lids
- 6) Wire screen
- 7) Plaster of paris
- 8) Many different species of insects
- 9) Sugar water solution
- 10) Test tubes
- 11) Tuning forks
- 12) Whistles
- 13) Ant farm (home-made or purchased)
- 14) Glass beehive
- 15) Frame of bees
- 16) Flour
- 17) Salt
- 18) Alum
- 19) Pipe cleaners
- 20) Tissue paper
- 21) Collection of dead branches, wasp nests (empty), etc. for collages

Activities:

- 1) Ask children to bring in plastic milk cartons, masking tape, plastic wrap and fine screen. Construct habitats for the insects, using the above materials. Cut a large observation window in the front of the milk carton. Cover the opening with plastic wrap and secure firmly. Use fine screen to cover top of bottle to allow for entry of air. If larger housing is needed, cut out side of milk cartons and secure together.
- 2) To make larger cages for moths, butterflies and other flying insects, select 2 large plastic lids from 3 lb. coffee cans. In the bottom of 1 lid, pour plaster of paris. While this is still wet, place a 12-inch high section of wire screen in the lid, forming a circle. Let plaster set up. Then use your other plastic lid as a cover. Place a dead tree branch in your cage as a perch for the insects.

- 3) Encourage children to bring in many different species of insects to dwell in your cages. (Not only that would be dangerous, such as wasps, hornets, bees, etc.). Inform children that insects which eat plants are usually found on their food source and they should bring some of this with the insect. Supply a sugar solution in a small vial using a "wick" of cotton or cheese cloth from which the insects can obtain nourishment without drowning. Non-plant eaters will survive on powdered dog food as long as a water supply is available.
- 4) Divide your class into groups of 5 or 6. Have these groups study the effects of heating or chilling insects. Use test tubes of hot water or ice. Can insects hear? Use whistles, tuning forks and try to determine if insects react. Observe meal worms (can be obtained at pet store) and try to answer such questions such as: a) Can they see?, b) How do they move?, c) Do they back up?, d) How fast can they travel?, e) Can they swim?, f) Can they smell food? These questions can be applied to other insects as well.
- 5) Make an ant farm from 2 panes of glass placed side by side and bound together in a wooden frame. Fill the thin space between the 2 layers of glass with soil so the ants can dig their tunnels and rooms. To find your ant colony, look under old boards or flat rocks or in the soil in your lawn or garden. Be sure to get ants, larvae, pupae and a queen if possible. Feed your colony with bits of bread soaked in syrup, scraps of meat and dead insects such as flies. Give ants wet sponge to suck. Observe the social activities that go on in the ant hill. Try to identify the nursemaids, soldiers, etc.
- 6) Contact a bee keeper in your neighborhood if one is available and see if you can arrange for a field trip to his hive to observe how bees also function in a society.
- 7) If possible, obtain a glass beehive for your room. One can be built with a wooden frame with glass sides. One end of the hive extends outdoors, under the window, so that the bees can come and go just as they would from any beehive. The hive is built to fit around a standard frame which you can obtain from a bee keeper in your community. The frame you use should have honeycomb, honey, developing bees, nature bees and a queen. Observe behavior of bees and keep note cards to be used later in research paper.
- 8) Make insect replicas from a mixture of flour, salt and alum, pipe cleaners and tissue paper. Mix 2 cups of flour, 1 cup of salt, water (between 1/2 and 3/4 cups) and 2 tablespoons of alum. Mold and shape your insect. Cut up pipe cleaners for legs and feelers. Stick them into the sides of the dough bag. Bend pipe cleaners into the shape of wings. Glue tissue paper over pipe cleaners. Stick the wings into the insect. When clay has dried for about a day, paint with tempera paint. Cover the colors with shellac.
- 9) Make a collage using dead branches, abandoned wasp nests and any other things that would tie into a picture utilizing dough insects. Mount on heavy tagboard or cardboard.

Follow-up Activities:

After investigations and observations have been made, research reports could be written incorporating some of these questions:

- 1) How does an insect breathe?
- 2) How does an insect hear?
- 3) How do insects communicate?
- 4) How do insects protect themselves?
- 5) Where do insects lay their eggs?
- 6) What is insect metamorphosis?
- 7) Why do young insects keep losing their skins?
- 8) What is a pupa?
- 9) Where do insects go in the winter?
- 10) How does a firefly's light work?
- 11) How can you tell a moth from a butterfly?
- 12) What are "social insects"?
- 13) What is life like inside a beehive?
- 14) What is life like inside an ant colony?
- 15) What are termite colonies like?
- 16) What are some diseases carried by insects?
- 17) How do insects help us?
- 18) What is the work of each part of an insect's body?
- 19) Of what value is a compound eye to an insect?
- 20) How is the life cycle of a butterfly different from the life of a grasshopper?
- 21) What are the differences between queen, worker and drone bees?
- 22) Report on praying mantis.
- 23) What causes bees to swarm?
- 24) How do wasps make paper?

Evaluation:

Each student:

- 1) Recognized 5 different species of insects.
- 2) Participated in class observations of environmental influences on insects.
- 3) Listed the function of queen, worker and drone bees in an active beehive.
- 4) Listed the function of queen, soldier and nursemaid ants in an ant colony.
- 5) Identified the stages of metamorphosis in an insect's life.
- 6) Participated in creating replicas of insects and depicting a scene putting them into their natural habitat.

Reference Materials:

- 1) World Book Encyclopedia
- 2) Make and Do, Childcraft, Vol. II
- 3) "Actions and Interactions of Insects" by Ronald G. Good, Instructor, June/July, 1972
- 4) "Project: Insect Activities for the Immediate Grades" by Edward E. Orsborn, Interdisciplinary Outdoor Education Program, Seattle, Washington, 1968
- 5) Elementary School Science and How to Teach It, "Keeping Bees in the Classroom", by Blough, Glenn O. and Schwartz, Julius, Holt, Rinehart and Winston, Inc., New York, New York, 1969

SOCIAL STUDIES EXERCISE PLANS
Incorporating Environmental Studies

ELEMENTARY SCHOOL LEVEL

Sources Consulted in Developing:

Environmental Education: Objectives and Field Activities
Paducah Public Schools
Paducah, Kentucky

People and Their Environment
Matthew J. Brennan
J. G. Ferguson Publishing Company
Chicago, Illinois

Teacher's Curriculum Guide to Conservation
Matthew J. Brennan
J. G. Ferguson Publishing Company
Chicago, Illinois

Compiled by:

Mrs. Susan Rhodus
Clintonville Elementary School
Bourbon County Schools
Paris, Kentucky 40361

Title of Lesson: Animal Tracks

Behavioral Objectives: At the conclusion of these activities, the student will be able to:

- 1) Recognize at least 8 different kinds of animal tracks
- 2) List at least 8 different kinds of animals that make these tracks
- 3) Tell where animal tracks may be located
- 4) Read animal tracks

Materials Needed:

- 1) Cardboard
- 2) Paper clips
- 3) Old cans for mixing
- 4) Water
- 5) Sticks for mixing
- 6) Plaster of paris
- 7) Paint
- 8) Brushes
- 9) Paper
- 10) Pencils
- 11) Chart paper

Activities:

- 1) Discuss pictures of tracks that you already have in your classroom. Examples should be tracks that will be most common in your area. Some animals in Bourbon County are weasels, opossums, rabbits, squirrels, raccoons, groundhogs, cows, skunks, dogs, cats, sheep, horses, burros, minks, rats, mice, turkeys, bats, chickens, ducks, geese, beavers, peacock, otter, muskrats, red foxes, gray foxes, chipmunks, deer. (Note that on pp. 87-89 in the Paducah Public School's Environmental Education booklet there are animal tracks already drawn. These could be copied.)
- 2) Discuss where to find animal tracks: snow, mud, wet sand, around creeks.
- 3) Before taking the field trip, a discussion on behavior in the outdoors should take place, being somewhat quiet and careful where you step so tracks aren't disturbed.
- 4) Field trip should be taken so the children can investigate on their own. Let them be detectives and find the tracks. Try to pick an area where the student will be able to locate some tracks.
- 5) The children should be divided into groups to find tracks and to look for specific answers to questions they have. Examples: a) How long and how wide is the track?, b) How many toes on the forefoot and hindfoot?, c) Where does it go?, d) What size is the track?, e) How fast was it traveling?, f) Is the foot made for climbing?
- 6) Compare human footprints with animal tracks: size, shape, impression and location of parts.
- 7) Compare 2-legged animals with 4-legged animals.
- 8) Look for evidence of animals' tracks who drag their tails (mice).
- 9) Try tracking and locating specific animals.
- 10) Place a small basket of food out in an area for animals to get to. Some foods are apples, carrots, nuts, peanut butter, sandwiches, meat or dried corn and leave overnight. By morning, there should be plenty of tracks.

Follow-up Activities:

- 1) On the bulletin board you can chart a particular area. List different kinds of animals that visit the area, when they visit, what they do and how many at a time.
- 2) Make a plaster impression of tracks. Find a clear track. Pick out any loose debris. Make a circle with the cardboard around the track. Fasten it with a paper clip. Push the paper into the ground about 1/2" so the plaster will not seep out. Quickly mix plaster and water until consistency of melted ice cream. Pour into tracks. Takes about 1 hour to harden. Before that time, paper clips can be bent and put into the cast to use later as a hook. When cast is set, take off form and brush dirt off with toothbrush. This is a negative task.
- 3) Track or background may be painted as an art project.
- 4) Positive cast made by greasing negative cast with grease or vaseline and place a cardboard around the cast. Cardboard should be 2" higher than cast. Fasten with paper clips. Mix plaster and pour into form. Let it set. Remove cardboard and separate cast. This new one is positive.
- 5) A record of accumulated tracks through the year can be kept with the date they were found.

Evaluation:

- 1) The student should be able to recognize and read animal tracks.
- 2) The student should be able to name the animals that make the tracks.
- 3) The student should be able to tell the places where animal tracks were found.

Reference Materials:

- 1) "Animal Tracks and Signs", film, University of Iowa (rental)
- 2) "Animal Traces", leaflet, Cornell Science, Vol. 59, No. 2, 25¢
- 3) "Animal Tracks", Audubon Chart
- 4) Animal Tracks, Mason, George F., William Morrow and Company, New York, 1943
- 5) Track and Tailcraft, Jaeger, Ellsworth, Macmillan Company
- 6) Environmental Education, Paducah Public Schools, Paducah, Kentucky

School Library Reference Materials:

- 1) Field Guide to Animal Tracks, Murie, O. J., Houghton, '54, 374p. illus.
- 2) Animal Tracks, Mason, George F., Morrow, '43, 95p. illus.
- 3) Snow Tracks, George, Jean, Dutton, '58, 62p. illus. by author
- 4) First Book of Animal Signs, Colby, C. B., Watts, '66, 90p. illus. by author
- 5) Big Tracks, Little Tracks, Branley, Franklyn M., Crowell, '60, unp. illus. by Kessler, Leonard
- 6) Discovering the Outdoors, Natural History Press, 128p. illus., Pringle, Laurence P.
- 7) How to Be a Nature Detective, Selsam, Millicent E., Harper, '66, 46p. illus. by Keats, Ezra Jack
- 8) Free materials from Florida Game and Fresh Water Commission, Dept. I. E., Farris Bryant Building, Tallahassee, Florida

Title of Lesson: Water PollutionBehavioral Objectives:

- 1) The child will be able to list reasons why water is polluted
- 2) Students will be able to list types of water pollution
- 3) The students will be able to discuss the effects that water pollution has on our lives
- 4) The children will be able to discuss orally the ways of preventing water pollution
- 5) The child will be able to identify possible signs of water pollution

Materials Needed:

- 1) Glasses
- 2) Water
- 3) Microscope
- 4) White disc connected with a long stick which is marked off in unit lengths
- 5) Films
- 6) Construction paper
- 7) Glue
- 8) Pencils

Activities:

- 1) Field trip can be taken to polluted area such as a pond, stream, lake or irrigation ditch.
- 2) Films on water pollution.
- 3) Comparison of a clean mountain stream and a polluted stream. This can also be used to motivate the discussion.
- 4) After the field trip, questions that could be asked are: a) How did you like the mess?, b) Would you like to drink water from this?, c) What can be done to erase this mess and to insure a pure water supply?, d) Where would the people in this area get their drinking water?, e) What are some possible water pollutants (oil wells, garbage cans, textile industries, coal mines, chemical plants, detergents, pulp and paper mills, insecticides, weed poisons, sewage, bacteria, picnickers, home garbage, litterbugs).
- 5) Examine polluted water and water from a faucet under a microscope.
- 6) Comparison of a glass of water from a faucet and a polluted stream. In front of polluted water, place a sign "Dangerous". Faucet glass--ask: a) Which one is good to drink?, b) How do you know?, c) Has this water been used before?, d) How do you know?, e) What makes this water good to drink? Polluted water--ask: a) What does the sign mean?, b) Do we drink this water?, c) Why is the water unfit to use?, d) Who is responsible for this?, e) What can we do about this?
- 7) Let students collect water from different areas of the community and place the examples in separate dishes to evaporate. Look at dishes and discuss results.

Follow-up Activities:

- 1) Visit and investigate various industrial plants which need water for various processes such as washing, drying, cooling and determine where and how industry waste products are removed.

- 2) Resource person on water pollution: L. Raymer Jones, Route 2, Paris, Kentucky, 40361.
- 3) Investigate ways to prevent water pollution.
- 4) Picture of dead fish. What caused this?
- 5) Let the students collect pictures of the misuse of streams. This can be put into a scrapbook.
- 6) Parents and friends can help the students find out ways to prevent water pollution (people who work in industries).
- 7) List things in the community that create water pollution.
- 8) Visit streams to see how individuals create pollution.
- 9) Visit a pond or lake and make a white disc test of the water. Place a disc attached to a stick which has been marked off down into the water until it is no longer visible. Take a reading and record. Repeat this several places and then of different bodies of water. Compare the visibility of the water.

Evaluation:

- 1) The child could list reasons why water is polluted and way of prevention.
- 2) The student could write an essay about the effect water pollution has on our lives.

Reference Materials:

- 1) Air and Water Pollution, Gerald, Leinwood, Washington Square Press, '69, available at the Bourbon County Schools Materials Center
- 2) "How Our Town was Saved", free film, Portland Cement Association, 33 W. Grand Avenue, Chicago, Illinois
- 3) "Clean Water", L. Raymer Jones, Route 2, Paris, Kentucky, 40361, film
- 4) "Pure Water and Public Health", film, Modern Talking Pictures, 9 Garfield Place, Cincinnati, Ohio
- 5) "Water: Wealth or Worry for America", Modern Talking Pictures, 9 Garfield Place, Cincinnati, Ohio, film
- 6) "Your Friend, the Water", film
- 7) "Beargrass Creek", film
- 8) L. Raymer Jones, resource person

School Library Reference Materials:

- 1) Water Fit to Use, Carlson, Carl Walter and Bernice, '66, 127p. illus. by Hansen, Aline
- 2) Conservation and You, Hitch, A. S. and Sorenson, Marian, Van Nostrand, '64, 126p. illus.
- 3) Water for People, Riedman, Sarah R., Abelard, '60, 156p. illus. by Tagawa, Bunji
- 4) Clean Air--Sparkling Water, Shuttlesworth, Dorothy, Doubleday, '68, 95p. illus.

EXERCISE #3

Title of Lesson: Air Pollution

Behavioral Objectives:

- 1) The student will be able to list 5 causes of air pollution
- 2) The student will be able to describe the effects air pollution has on our bodies
- 3) The child will be able to describe orally 4 remedies for eliminating air pollution
- 4) The student will be able to write a discussion about the problems and cure of air pollution

Materials Needed:

- 1) "The Ocean of Air", film
- 2) Paper
- 3) Book and pamphlets on air pollution
- 4) Dirty air filter
- 5) Construction paper
- 6) Pencils
- 7) Crayons

Activities:

- 1) Introduce lesson by a riddle such as:
I seem like nothing; but I have weight.
I have no color, no smell, no taste.
You can feel me; you can push me.
Without me you would live in a silent world.
I am necessary; I am dangerous.
You control me; I control you.
Follow you; you follow me.
What am I? Air!
- 2) Questions that could be asked to stimulate discussion or to base what you want to learn about air pollution on: a) "Let's take a drive in the clean, country air." What is meant by this?, b) Is country air always clean?, c) What are some causes of dirty air?, d) What is dirty air called (air pollution)?, e) What are some things in the air that can poison us (chemicals, small particles of radio-active material)?, f) How do these poisons get into the air (atomic explosions, by-products of heating, enemy attack--explosives, exhaust from factories, exhaust from automobiles)?, g) How does air pollution affect our bodies (emphysema, bronchitis, lung cancer, common colds, pneumonia, bronchial asthma)?, h) Who can the community turn to for help (local, state and national government, U.S. Department of Health, Education and Welfare)?, i) Types of air pollutants., j) What can we do to control air pollution?, k) What can the school do to clean up the air?, l) What happens to our local garbage?
- 3) Show the film, "The Ocean of Air".
- 4) Show a dirty furnace filter and illustrate dust and foreign particles in the house. Air conditioner filter can also be used.
- 5) Light a candle and hold a metal spoon over the candle. Discuss what is found on the spoon.
- 6) Field trips to view air pollution (smoke from furnaces, burning trash, leaves, etc.).
- 7) Visit the mayor and county, state and federal representative to find out their stand on air pollution and what they intend to do about it.
- 8) Ask parents for causes of dirty air.
- 9) Why does London have killer fogs?

Follow-up Activities:

- 1) Bulletin boards illustrating sources of air pollution.
- 2) Panel discussion on "Air Pollution in Your Community":
- 3) Scrapbook of clippings, drawings and pictures concerning air pollution.
- 4) Count a specific number of automobiles with excessive exhaust fumes.
- 5) Skit can be performed to show effects of air pollution.
- 6) Books, periodicals and pamphlets for research of questions asked.
- 7) List things citizens can do to lessen air pollution.
- 8) Map the community for sources and types of air pollution.

Evaluation:

- 1) The child could list causes and ways of preventing air pollution.
- 2) The child could write a paper about the ways of eliminating air pollution.
- 3) The student could describe orally the effects air pollution has on our bodies.

Reference Materials:

- 1) People and Their Environment, Brennan, Matthew J., J. G. Ferguson Publishing Company, Chicago, Illinois
- 2) Teacher's Curriculum Guide to Conservation Education, Brennan, Matthew J., J. G. Ferguson Publishing Company, Chicago, Illinois
- 3) "Oceans of Air", film
- 4) See reader's guide, Smog or Fog Story"
- 5) Air and Water Pollution, Leinwood, Gerald, Washington Square Press, '69, available at the Bourbon County Schools Materials Center
- 6) Air Pollution Primer, National Tuberculosis and Respiratory Disease Association, New York, '69; available at the Bourbon County Schools Materials Center
- 7) Pollution Control, Viewpoint, 1970, debate material, Springboard, Inc. available at the Bourbon County Schools Materials Center
- 8) "Air Replenished", transparencies, Life Education Program, Box 834, Radio City Station Post Office, New York, New York
- 9) Effects of Air Pollution on Our Lives, Creative Visuals, Box 310, Big Springs, Texas, available at the Bourbon County Schools Materials Center

School Library Reference Materials:

- 1) Free materials from Air Pollution Control Association, 4400 Fifth Avenue, Pittsburgh, Pennsylvania
- 2) Conservation Foundation, 1250 Connecticut Avenue, Washington, D. C.
- 3) Free materials from Garden Club of America, Conservation Committee, 598 Madison Avenue, New York, New York
- 4) Free materials from National Wildlife Federation, Educational Services, 142 Sixteenth Street, N.W., Washington, D. C.
- 5) Clean Air--Sparkling Water, Shuttlesworth, Dorothy E., Doubleday, '68, 95p. illus.

Title of Lesson: Tombstones Tell AllBehavioral Objectives:

- 1) The child will be able to tell about the early settlement of their community
- 2) The child will be able to list at least 3 places from where the early settlers came
- 3) The student will be able to name data such as earliest death recorded, wars represented and types of known occupations of the people
- 4) The student will be able to make a comparison of materials used in the tombstones of today and yesterday
- 5) The child will be able to name the important settlers of their community

Materials Needed:

- 1) Paper
- 2) Pencils
- 3) Colored chalk
- 4) Butcher paper
- 5) Paint
- 6) Crayons

Activities:

- 1) First, a discussion should be held before the field trip to the cemetery so that the children have an idea of what to look for when they go. Divide them into groups with 2 or 3 people to record things they find. A list should also be made for them so they will remember what to do. Some questions are: a) Name of people who are familiar to the community., b) Name of the person who has the earliest death recorded on the tombstone., c) List of people who fought in wars., d) List of wars the men fought., e) The age of the youngest man killed in action., f) Are there any particular emblems on the tombstones which tell you anything about the person?. g) List types of occupation of the early settlers., h) List of the different countries the people migrated from., i) List of different states the people came from., j) List of materials used in making tombstones., k) List at least 3 interesting epitaphs., l) Are there any hints about the religion of the people?
- 2) Take a field trip to the local cemetery to find out answers to questions the children want answered.
- 3) Categorize the information of what the children recorded on their trip.
- 4) Make conclusions about the information.
- 5) Further study about their conclusions, or findings, will probably be necessary. A trip to the county courthouse may be necessary for finding information on certain people. The public library may also have to be consulted.
- 6) The children can go home and ask their relatives about their ancestors.
- 7) Each child can pick out a particular tombstone and see if they can research it themselves.

Follow-up Activities:

- 1) See if there is a reliable resource person to turn to for information.
- 2) Rolls of butcher paper may be used to make a "rub". Place a piece of paper over the engraving on the tombstone and rub over it with a pencil or crayon so that the imprint appears on the paper.
- 3) Make a map of the U.S. and Europe to show the migration of the people to our area.
- 4) Murals depicting the battles the men fought.
- 5) Comparison of materials used in making tombstones in colonial days and today.
- 6) The children can write a story about the one person they researched from the tombstone.

Evaluation:

- 1) The child could write in an essay form the history of their community.
- 2) The majority of the students could list places from where the settlers migrated.
- 3) When tested, the students could recall such data as earliest death, wars, occupations and important people of the community.

Reference Materials:

- 1) John Fox Library, Duncan Tavern, Paris, Kentucky
- 2) Mrs. W. H. Whitley, Paris, Kentucky
- 3) Environmental Education Objectives and Field Activities, Major, James E. and Cissell, Charles A., Paducah Public Schools, Environmental Education Staff, c1970 and 1971
- 4) Spoon River Anthology, Masters, Edgar Lee, Bourbon County High School Library, Paris, Kentucky

EXERCISE #5

Title of Lesson: Plant CommunitiesBehavioral Objectives:

The students will be able to identify at least 5 different things found in wooded, field and the edge of field and wooded areas

Materials Needed:

- 1) Pencils
- 2) Paper
- 3) Paper bags

Activities:

- 1) A field trip should be taken to an area where all 3 areas can be explored. Divide the class into groups of 6 or 8. Each group should move to all the areas and make a list of the things that can be found in each area.
- 2) When they return, questions could be asked to stimulate their discussion of their findings. Examples: a) How many kinds of plants did

- you find?, b) Where was the most growth?, c) Was the ground cover made up of the same kind of plants in all the places?, d) How would you contrast the growth on the floor of the forest and the ground cover of the field?, e) Which is more spindly? thicker? more mat-like? f) What might be an explanation for the differences you have noticed?
- 3) How does the soil feel in each area?

Follow-up Activities:

- 1) Research can be done on plants that are unfamiliar to the students.
- 2) Categorize the plants that are found in each area. A separate list can be made of plants that are found in more than 1 area.
- 3) Samples of plants from each area can be gathered and replanted in different environments to see what would happen.
- 4) Terrariums may be set up with the different kinds of plants found in each area.

Evaluation:

The child could identify the different types of plants found in each area.

Reference Materials:

- 1) People and Their Environment: Teacher's Guide to Conservation Education, Outdoor Laboratory
- 2) Teacher's Curriculum Guide to Conservation Education
- 3) Southeastern Pennsylvania Outdoor Education Center

EXERCISE #6

Title of Lesson: Land Use

Behavioral Objectives: At the conclusion of this exercise, the students will be able to:

- 1) Identify 3 ways of making soil
- 2) List ways farmers in Bourbon County use the land
- 3) Identify crops that are grown in Bourbon County
- 4) List 3 factors which affect the use of the land
- 5) Name the causes of soil erosion
- 6) Identify and explain the methods used to prevent soil erosion

Materials Needed:

- 1) Chemical soil kits
- 2) Spoon
- 3) Knife
- 4) Metric ruler
- 5) Hand lens
- 6) Soil thermometer
- 7) Terrarium
- 8) Radish seeds
- 9) Plastic
- 10) Leaves
- 11) Bucket

Activities:

- 1) Collect soil from local farmers surrounding counties, different sections of the state and possibly from different parts of the country. Test these for potassium, nitrogen, acidity and phosphorus. Contact the nearest Soil Conservationist to test your samples or use a Soil Chemical Kit. You can also test for sand, rock and water content of the soil.
- 2) Plant radish seeds in your soil examples. Keep them under identical favorable conditions. Record when seeds were planted, when they sprout and how well they grew.
- 3) Make a map to show the structure and composition of land in your samples.
- 4) List on a chart the natural foods produced in Bourbon County.
- 5) Plan a menu using natural foods grown in the county.
- 6) Take a walk to collect samples of misused soil to demonstrate the difference between the examples of soil.
- 7) In the fall, start a small "compost heap" in a bucket or terrarium. Cover with plastic or glass to keep it moist. Examine the leaves from time to time to see if soil is forming.
- 8) Take a field trip to a farm which shows practices of soil conservation. (In Bourbon County, Mr. Raymer Jones' farm is a very good example of contour plowing.)
- 9) Visit an area where there are good examples of soil erosion.
- 10) Let's play a game. Make a list of 15 things you can think of in 2 minutes. List things like paper, meat, crackers and shoes. Ask your parents to help you determine how many come from the soil. How many come from plants?
- 11) Try to define soil. Discuss possible answers. Then collect examples and determine a good definition for soil.
- 12) Posters can be made to show good conservation activities.
- 13) Plant a tree or grass on eroding areas at home or school.
- 14) Have the pupils measure a ditch or gully near erosion. Check length, width, depth and record them. Drive wooden pegs on sides and head of gully measured to assist in remeasuring later. After several hard rains, remeasure gully.

Follow-up Activities:

- 1) Have a debate on Soil Erosion Prevention.
- 2) Write an essay on ways land can be used effectively.
- 3) The children can list ways the misuse of land affects man.
- 4) Evaluations can be made orally by the children on the growth of plants in the different soils.
- 5) Any of the filmstrips or films listed can also be used as a follow-up.
- 6) Speakers can also be brought in to discuss with the children their questions and discoveries.

Resource Persons:

- 1) Raymer Jones, Route 2, Paris, Kentucky
- 2) Mernie Milam, Route 4, Paris, Kentucky

Reference Materials:

- 1) People and Their Environment: Teacher's Guide to Conservation Edu-

- cation, Outdoor Laboratory, Brennan, Matthew J., J. G. Ferguson Publishing Company, Chicago, Illinois, '68
- 2) Return to Eden, Jones, L. Raymer, Field Representative, Division of Soil and Water Conservation, Route 2, Paris, Kentucky (Bourbon County only)
 - 3) "Yours is the Land", film, L. Raymer Jones, Paris, Kentucky
 - 4) "This is Our Land", University of Kentucky, Audio Visual Services, Lexington, Kentucky
 - 5) "Our Land: Its Many Faces", University of Kentucky, Audio Visual Services, Lexington, Kentucky
 - 6) "Soil", pamphlet, Griffin, Fair C., National Wildlife Federation, '69
 - 7) "Land Use", pamphlet, The Courier-Journal and The Louisville Times
 - 8) "Outdoors USA", U.S. Department of Agriculture, '67
 - 9) Environmental Education, Paducah Public Schools, Paducah, Kentucky
 - 10) "All the Difference", film, Modern Talking Pictures, Cincinnati, Ohio

EXERCISE #7

Title of Lesson: Dams

Behavioral Objectives: At the conclusion of this exercise, the students will be able to:

- 1) List 3 ways the building of dams hurt the land
- 2) List 4 advantages for building dams
- 3) To describe orally how the dams affect the lives of the people
- 4) Define what a "dam" is

Materials Needed:

- 1) Plaster of paris
- 2) Cement
- 3) Dirt
- 4) Boats (plastic)
- 5) Firecrackers
- 6) Wood

Activities:

- 1) Discuss orally with the children what a dam is.
- 2) Discuss orally the different types of dams.
- 3) Oral discussion can also be held about "who makes dams".
- 4) Take a field trip to a dam.
- 5) Collect pictures of the different dams in the U.S. and around the world.
- 6) Make a bulletin board with the pictures that have been collected.
- 7) Show films and filmstrips of dams and the effect they have on the land.
- 8) Have the students make a scrapbook of facts about dams. Included in the facts could be the name, height, length, cost and location.
- 9) Make a bulletin board to ask questions for the facts you want the children to learn.
- 10) With the facts learned, have a quiz program. Divide the class into teams. Play the quiz game until you get one team the winner.

- 11) Construct a dam out of plaster of paris (see World Book D). Let the children blow it up. Later, construct a dam out of dirt. Try to force water to knock down the dam so the children will be able to see what happens when a dam breaks.

Follow-up Activities:

- 1) Describe in a written paper the effects dams have on the environment.
- 2) Have a debate on the pros and cons of building dams.

Reference Materials:

- 1) World Book Encyclopedia, Vol. D, 5, 1972 edition
- 2) Reader's Digest, condensed from Atlantic Monthly by Claire Sterling, July, 1972
- 3) "Louisville Courier-Journal", March 13, 1971; January 31, 1972; November 13, 1971; September 6, 1971; October 14, 1971
- 4) "Falmouth Outlook", September 24, 1971
- 5) "Lexington Herald-Leader", Lexington, Kentucky, January 16, 1972
- 6) Science World, Cusack, May 8, 1972
- 7) "Dam the Delta", University of Kentucky, Audio Visual Services, Lexington, Kentucky
- 8) "Dam", University of Kentucky, Audio Visual Services, University of Kentucky
- 9) "Hold Back the Sea", University of Kentucky, Audio Visual Services, Lexington, Kentucky
- 10) "The Mighty Columbia River", University of Kentucky, Audio Visual Services, Lexington, Kentucky
- 11) "The Nile in Egypt", University of Kentucky, Audio Visual Services, Lexington, Kentucky

EXERCISE #8

The following are songs and games compiled by Mrs. Rhodus which may be of use in the classroom:

ANTIPOLLUTION SONG (tune of "Bonnie")

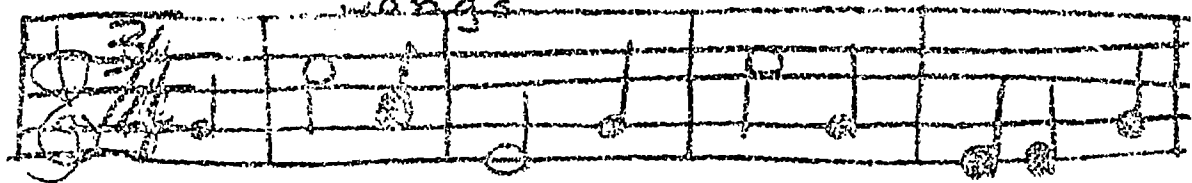
The litter blows over our highways,
The litter blows all 'round our yard
If only we'd look for a trash can
Earth clean-up would not be so hard!

Pick up, pick up
Pick up the trash that you see, you see.
Save tax money, save tax money
For you and your whole family.

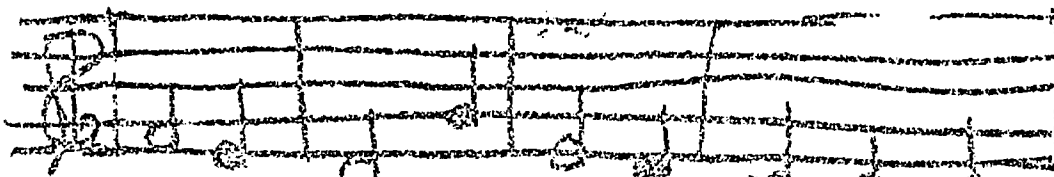
The bluefish lie dead in the ocean
The codfish lie dead in the sea
They all died of water pollution
Caused by us and some industries

Don't swim, don't swim,
Remember the bluefish and cod, and cod.
Wastes in our sea, wastes in our sea,
Will kill more than bluefish and cod, poor cod.

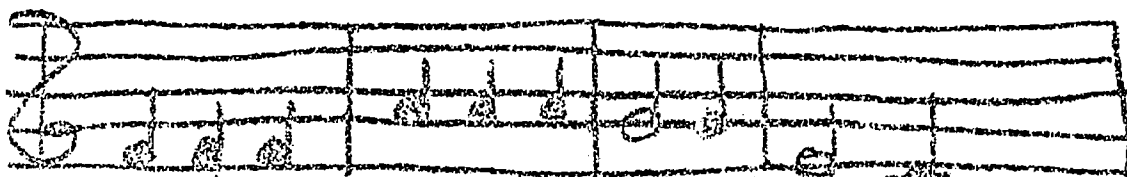
Songs



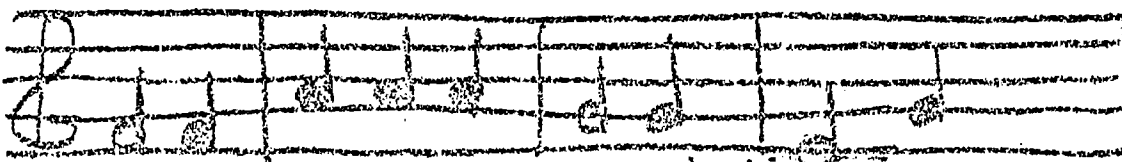
We love our state, we love our nation, That's



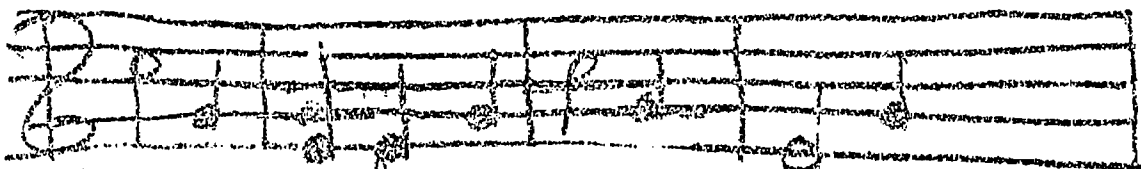
Why we practice conservation, We



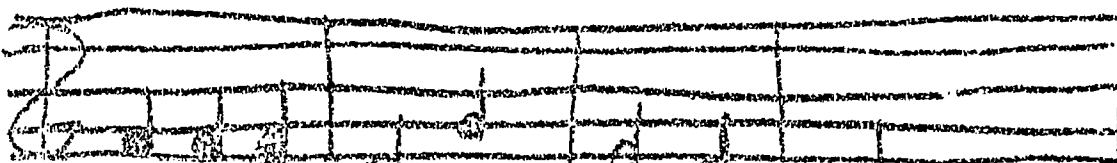
Care for our forests and wildlife too, Our



soil and water and so should you, We'll



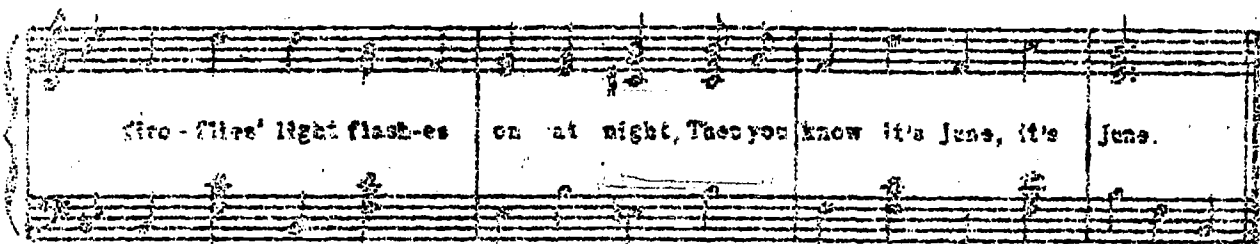
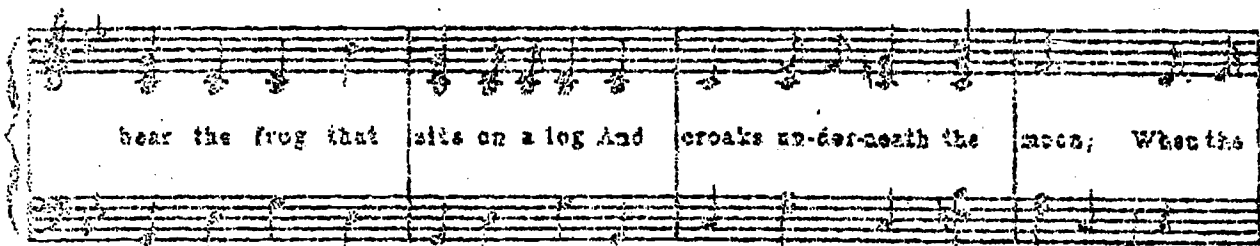
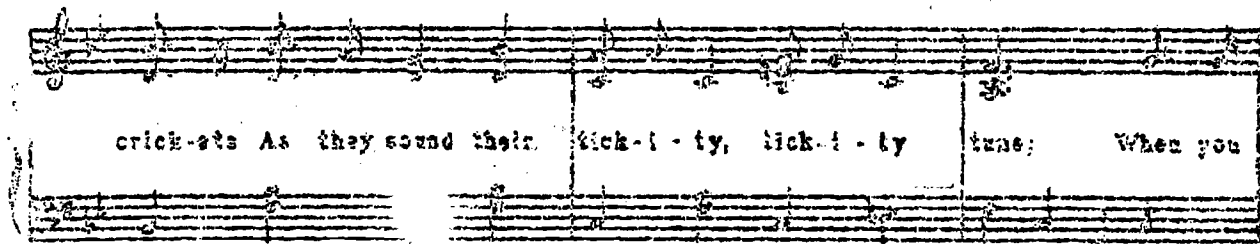
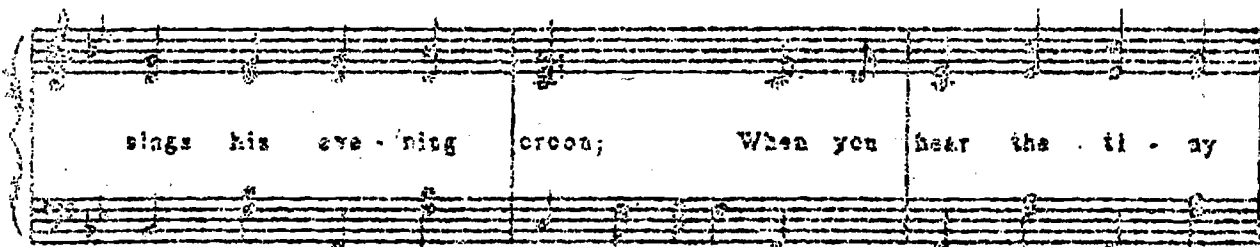
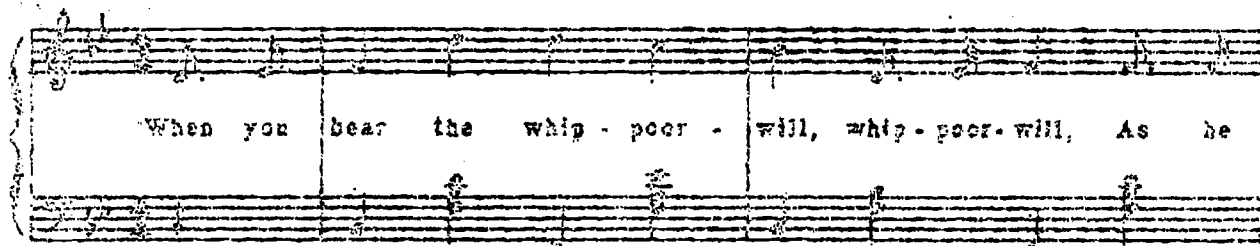
join to gether and work each day, To



make conservation really pay

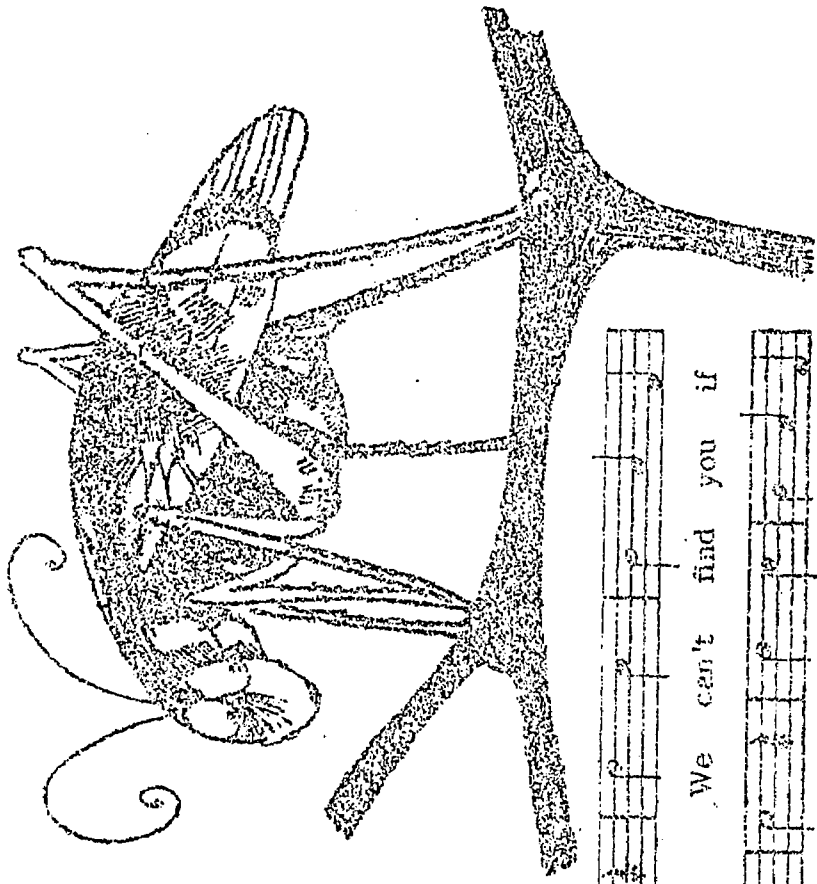
IT'S JUNE

Words and Music by RUTH STEPHENS PORTER



Katydid

ANOTHER unel action song, and another way to play hide-and seek. The group chooses a child to be the katydid. While classmates sing the words with eyes closed, katydid quietly finds a hiding spot. The hidden child sings the final three measures, and classmates open their eyes and try to guess where "the insect" is hiding. Repeat the song several times with different katydids.



MARGARET A. CHRISTENSEN

The musical score for the song 'Katydid' is written on three staves. The first staff begins with the lyrics 'Ka - ty - did, where did you creep? We can't find you if'. The second staff continues with 'you're a - sleep. Sing your tune, wher- ev- er you hid. Lis - ten, lis - ten to'. The third staff concludes with 'Ka - ty - did, Ka - ty - did, Ka - ty - did.' The melody is simple and repetitive, using a single note for most of the lyrics.

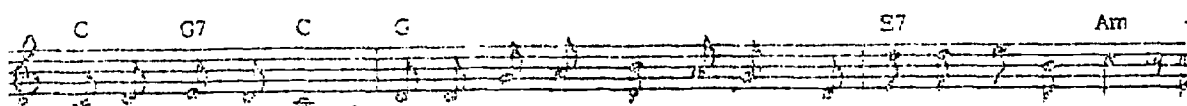
Instructor, August/September 1971

INSTRUCTION, Aug./Sept., 1971

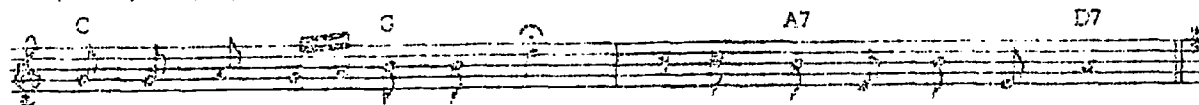
A lot of apple seeds



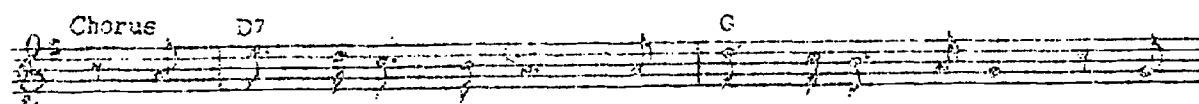
1. West-ward from O-hi-o came the stur-dy pi-o-neers, Meet-ing friends and meet-ing foes and
2. Years went by and sap-lings grew to stur-dy ap-pie trees, Tend-ed, trad-ed, sold, or giv'n by



brav-ing wants and fears. Came a man who dream'd a dream, though he was poor as they, Hi
John-ny Ap-ple-seed. He was friend-ly, he was peace-ful, lov'd by man and beast, He



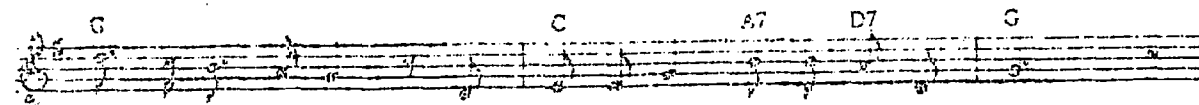
saw there were no ap-ple trees and vow'd he'd find a way.
saw the land and made it flow'r with ap-ple blos-soms sweet.



A lot of ap-ple seeds is what O-hi-o needs, And

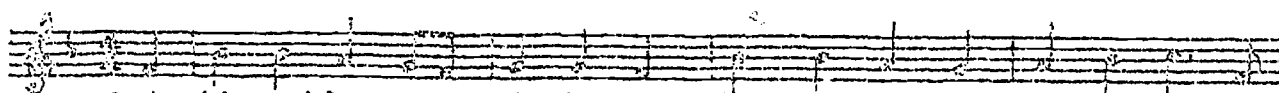


la-ter on I'll go to In-di-an-a. And when each seed is grown, each

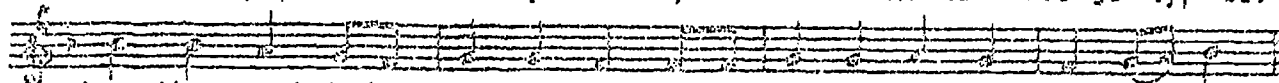


pi-o-neer will own spec-ial ap-ple tree.

The Frog and the Fish Words and Music by HELEN M. WEBSTER



1. A big eyed frog on a lil-ly pad, flipped his tongue to catch a fly, he
2. A sleep-y fish in the deep blue lake, blinked at bait in hot Ju-ly, but



jumped ker-splash in the deep blue lake when a mo-tor boat went zig-ging by.
he woke up and he swam a-way when a mo-tor boat went zig-ging by.

APPLE-TREE RHYME

Here stands a good apple tree;
Stand fast at root,
Bear well at top;
Every little twig
Bear an apple big;
Every little bough
Bear an apple now;
Hats full caps full!
Threescore sacks full!
Hullo, boys! hullo!

—OLD RHYME

IF I WERE AN APPLE

If I were an apple
And grew on a tree,
I think I'd drop down
On a nice boy like me.
I wouldn't stay there
Giving nobody joy;
I'd fall down at once
And say, "Eat me, my boy!"

—OLD RHYME

APPLE PIE

A was once an apple pie,
Picky,
Widly,
Tidy,
Picky,
Nice inside,
Apple pie!

—EDWARD LAR

from *Illustrated Songs and Rhymes*
Published by
Frederick Warne & Co., Ltd., used
by permission.

1. He trudg-as o-ver moun-tains, he ca-nocs up the streams. He
2. The tales of his ad-ven-tures, how we love to re-call, He

brings ap-ple seeds. in ter-pies In-dian dreams, And soon up-ple blos-soms are
loved man and beast. be- friend-ed one and all, He played with the bear cubs while

swing-ing on a bough, And he's the Great White Med-i-cine Man to
Meth-et watched near-by. The leg end of old Ap-ple-seed John will

Chorus C F G7 C
ev-ry In-dian now. Oh. John-my Ap-ple-seed, John-my Ap-ple-seed, Peace-ful kind, and
nev-er, nev-er die. C F Dm C G7 C

true. Oh, John-my Ap-ple-seed, John-my Ap-ple-seed, He lived his dream for you.

Three Cheers for Johnny Appleseed

Three cheers for John-my Ap-ple-seed, Three cheers for John-my
Ap-ple-seed, Hur-rah! Hur-rah! Hur-rah!

THE COCOON (Finger Play)

Here's a cocoon
On a twig, in a tree.
Something is stirring!
Let's wait and see.

Something comes out
With wings folded tight.
Now, they are spreading
All ready for flight.

It's a beautiful,
Fluttery, butterfly.
Away it goes flying....
Goodbye! Goodbye!

To dramatize the action of the finger play, the children can use the left hand for the tree with fingers outspread. The right hand balled into a fist is the cocoon. Let it rest in the crotch of the tree between the thumb and the forefinger. To hear "something" stirring, place an ear close to the cocoon. Then, put thumbs together side by side with the fingers of the hands in fists to make the emerging butterfly. Slowly, open the fingers so the insect can fly. Children can set on their chairs until it is time to slide off and "fly" about the room. Use a musical accompaniment to encourage rhythmic movement.

GAMES..POLLUTION PUZZLE..Use the following words:

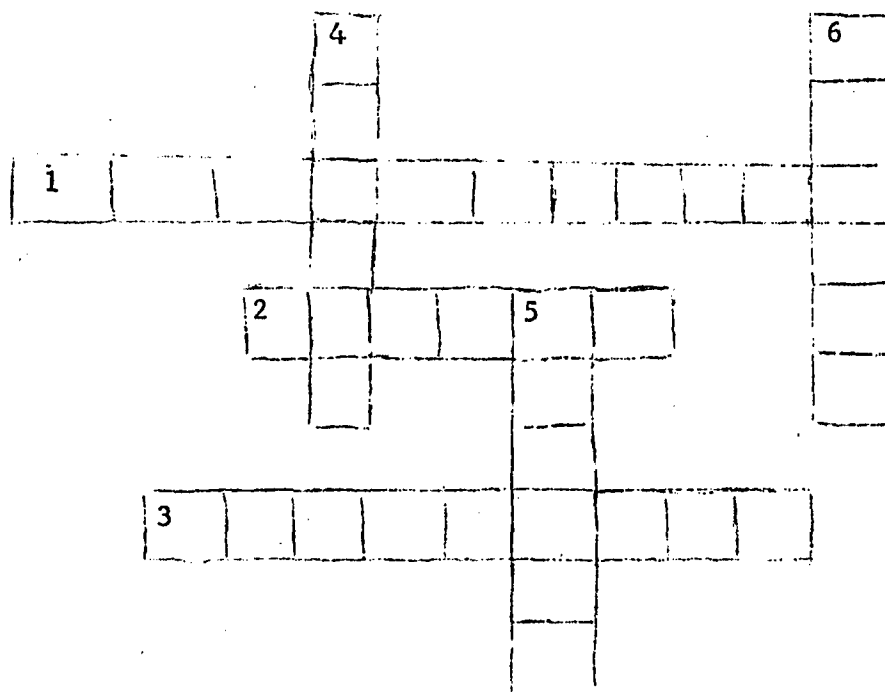
Environment
Litter
Noises
Pollution
People
Cities

Across

- 1) Air part of your _____.
- 2) _____ make litter.
- 3) Dirt and smoke in the air is air _____.

Down

- 4) Some _____ bother people and animals.
- 5) Trash left on the ground is called _____.
- 6) Some _____ are too crowded.



SOCIAL STUDIES EXERCISE PLANS
Incorporating Environmental Studies

ELEMENTARY SCHOOL LEVEL

Compiled by:

Miss Connie Padgett
Millersburg Elementary School
Bourbon County Schools
Paris, Kentucky 40361

Title of Lesson: Litter and Solid Waste

Behavioral Objectives: At the conclusion of this exercise, the children should be able to:

- 1) Identify the many sources of litter and solid waste materials (examples: people, animals, industry, etc.)
- 2) Classify the different types of litter and solid waste materials (paper, tissues, candy wrappers, food containers, cans, reading materials, etc.)
- 3) Distinguish between helpful and harmful litter and solid waste materials
- 4) Identify and elaborate upon the 3 means of garbage disposal
- 5) Identify and discuss litter laws
- 6) Discuss the advantages of recycling
- 7) Define biodegradability and tell its advantage

Materials Needed:

- 1) Waste containers (large garbage bags or boxes)
- 2) Litter and solid waste materials
- 3) Chart paper
- 4) Magic markers
- 5) Soil
- 6) Shoe boxes (7)
- 7) Small magnet
- 8) Compass
- 9) Flashcards
- 10) Oaktag
- 11) Toothpicks
- 12) Candle

Activities:

- 1) Take a "little walk" and collect litter and solid waste materials that can be found around your school yard, community and rural areas that have been left by people, animals or industry. Use a magnet to find metal objects that may be in cracks and small holes. (Each person today throws out approximately 6 pounds of garbage per day as compared to 3 pounds per person in 1920. Your daily garbage load is estimated to increase to 8 pounds per person by 1980.)
- 2) Sort the litter findings into piles (example: candy wrappers in 1 pile, facial tissues in another and so on). Some questions to ask could be: a) How many types of litter did you find?, b) Which types were the most common?, c) How many more pieces of the most common type were there than pieces of the rarest type of litter?, d) Near what objects were the largest amounts of litter found?, e) How might litter and solid waste materials found in rural areas differ from materials found in urban areas?, f) From what source does most litter come (people, industry, etc.)?
- 3) Make a map of the area where you collected litter and waste materials, marking the place where litter was the most abundant (can be indoors or outdoors). Questions: a) Does the location of litter and solid waste provide some answers as to the direction from which the wind blows frequently?, b) How could a compass and a weather vane be used to determine this direction?

- 4) Use a compass to mark the map you made. Select symbols to represent the different kinds of litter and waste materials. Make a key in the corner showing the symbol for the different kinds of litter and waste.
- 5) On the map, locate the paths or streets most often used by people as indicated by the litter and waste materials.
- 6) Discuss the littering laws in your community and state. Observe the littering laws that are found along the highways. Question: Why did people make laws concerning litter and solid waste?
- 7) Bring in resource people (mayor, city council, health department, fire department, etc.).
- 8) Discuss, if possible, the ways of getting rid of garbage (open burning, incinerator, sanitary landfill). Questions: a) What is done with the ashes of burned garbage?, b) What is done with garbage that will not burn?, c) What kinds of pollution are caused by incinerators?, d) What types of pollution do incinerators help to reduce? e) What types of garbage and litter are health hazards because they could encourage disease or cause accidents?
- 10) Discuss the advantage of recycling and biodegradability of litter.
Recycling: a) Changing matter from one form to another, b) Ability to reuse paper that saves hundreds of virgin forest each year. U.S. imports \$6 million worth of waste paper a year for making egg cartons and pasteboard., c) Glass bottles are used in the paving of highways., d) Waste from slaughter houses is being processed as cattle feed as is the grain dust from storage elevators.
Biodegradability: a) Leaves decay fertilizer for the soil., b) Dead animals put needed nutrients back into the earth., c) Lead children to concept that not all litter is a worthy biodegradable substance. Aluminum does not break down, throw-away bottles and plastic does not change easily.

Follow-up Activities:

- 1) Construct a "Twenty Questions" box. (Covered shoe box with a slit in the top.) Label "Trash or Treasure". Fill in with litter of twigs, labels, bottle caps, rusty bobby pins, glass, dry leaves, etc. An oaktag envelop labeled "Quiz Your Neighbor" and containing a set of teacher-made flashcards on which are printed questions about litter, solid waste and garbage with answers on the back.
- 2) Allow for short "buzz sessions". After each new concept concerning littering, garbage and waste materials have been introduced.
- 3) Make a master of a chart resembling a bingo card. Print the letters E-A-R-T-H in the top 5 spaces and number from 1-5 down the left side. Paste copies on oaktag and cover with clear contact paper for protection. Print "litter" and "waste" words on small oaktag words (words starting with the letters in (earth). On another set of small squares, print each letter in "earth" plus a number from 1-5 (E1, E2). Play as regular bingo is played. A good small group game.
- 4) Make some "litter gardens" to further establish the concept of biodegradability. Line 6 or 7 shoe boxes with plastic wrap and half fill with soil. Plant 2 identical rows (the long way) with 4 items each. Example: A hair clip, a piece of plastic, a piece of aluminum foil and a piece of newspaper in each row. Use different items in each of the boxes. Identify each piece with a tag on a toothpick. Keep the soil slightly damp at all times. At the end of a week, the children can carefully dig up 1 row in each box, allowing time between each "dig" for observation to be recorded. At the end of the second week,

have them dig up the 2nd row in each box and record observations. Questions: a) Which materials showed signs of wearing down?, b) Which materials remained the same?, c) Which materials are biodegradable?, d) Which ones could pollute the landscape indefinitely?, e) Can materials be "degraded" in any other way? Take all the materials that did not show signs of deterioration in the soil and hold each, in turn, with tongs over a candle flame. Ask the children to observe which materials burn, which do not burn, give off smoke, give off odor. Which of these make the most undesirable litter? Which could contribute to air pollution?

- 5) Write poems or short stories about the effects of litter to our community.
- 6) Make posters or collages: display some of the litter and waste materials around us.
- 7) Have children bring in clippings or articles about littering and disposal of solid waste concerning their hometown and neighboring areas. Display on a wall, chart or bulletin board.

Evaluation:

At the conclusion of this exercise, the children will be able to:

- 1) Identify the sources of litter and determine which source or sources are the major causes of litter and solid waste.
- 2) Classify the different kinds of litter (candy wrappers, tissues, etc.) and estimate as to who is responsible for each different classification.
- 3) Interpret the difference between helpful and harmful litter and solid waste materials.
- 4) Identify and expand upon the 3 ways of disposing garbage.
- 5) Recognize and elaborate upon the littering laws of his state and surrounding areas.
- 6) Define and elaborate upon recycling and biodegradability.

Reference Materials:

- 1) Bourbon County Schools Outdoor Laboratory
- 2) The Trouble with Trash, Wayne Supply Company, Lexington, Kentucky
- 3) The Litter Fact Book, Glass Containers, Manufacturers Institute, Inc., New York
- 4) Pollution Examining Your Environment, Mine Publications, Inc., Minneapolis, Minnesota, 1971
- 5) The Solid Waste Fact Book, Glass Containers, Manufacturers Institute, Inc., New York
- 6) Where Does It Go from Here?, Wayne Supply Company, Lexington, Kentucky
- 7) National Wildlife Federation 1971 EQ Index, National Wildlife Federation, Washington, D. C., 1971
- 8) "Man and His Environment", The Courier-Journal and Times, Louisville, Kentucky, 1970
- 9) "Recycling: Answer to Our Garbage Predicament?", Reader's Digest, March, 1972
- 10) "The Earth", Grade Teacher, October, 1970

SOCIAL STUDIES EXERCISE PLANS
Incorporating Environmental Studies

ELEMENTARY SCHOOL LEVEL

Sources Consulted in Developing:

People and Their Environment

Matthew J. Brennan
J. G. Ferguson Publishing Company
Chicago, Illinois

Teacher's Curriculum Guide to Conservation

Matthew J. Brennan
J. G. Ferguson Publishing Company
Chicago, Illinois

Earth is My Home

Sandra Sanders
Scholastic Book Services
New York

Sharing the Earth

Anita Homes Soucie
Scholastic Book Services
New York

Compiled by:

Mrs. Brenda Walker
North Middletown Elementary School
Bourbon County Schools
Paris, Kentucky 40361

Title of Lesson: Our Beautiful Wildlife

Behavioral Objectives: After completion of these activities, the children should be able to:

- 1) Define the word "wildlife" and explain how the federal government uses it
- 2) 90% of pupils will be able to report on 3 animals' habits and needs
- 3) Identify 15 species of the state's wildlife

Materials Needed:

- 1) Books about animals
- 2) Construction paper for scrapbook
- 3) Magazines

Activities:

- 1) Discuss the word "wildlife". Bring to their attention that the federal government separates "fish" from "wildlife" in its terminology and administratively in the U.S. Fish and Wildlife Service.
- 2) Have each pupil read a story or book about an animal. Ask them to notice and keep in mind the animals' needs and habits.
- 3) Make a scrapbook of Kentucky's Wildlife. Drawings, clippings and summaries may be used. How does the wildlife supply your state (recreation, food, balance of nature, etc.)?
- 4) The most effective way to study wildlife is in the field. Take the class on a field trip and ask pupils to look for land and water usage which are providing a proper environment and those that are not providing a proper environment for wildlife. What are the basic needs of wildlife? The pupils will probably suggest food, water and cover. Discuss animal homes and food found in the area of the field trip.

Follow-up Activities:

Let the class choose an animal to study. Use encyclopedias to discover what the animal eats and what eats the animal.

Evaluation:

- 1) Children can define the word "wildlife" and explain how the federal government uses it.
- 2) 90% of students can list and describe 3 animals' habits and needs.
- 3) The child can identify 15 species of Kentucky's wildlife.

Reference Materials:

- 1) Our Natural Resources, Conservation Committee, The Garden Club of America
- 2) "Album of North American Animals", Rand-McNally and Company, Chicago, Illinois, 1966
- 3) The Wildlife of North America, Mason, George Frederick, Hastings House, New York, 1966
- 4) Wildlife in America, Matthiessen, Peter, Viking Press, New York, 1957

EXERCISE #2

Title of Lesson: Wildlife is Helpful to Man

Behavioral Objectives: After these investigations on helpful animals, students should be able to:

- 1) Name 10 ways in which insects, birds and small animals help man
- 2) 50% of pupils will be able to report and prepare posters showing how some insects are helpful
- 3) Attract birds and helpful animals to their yards
- 4) Write and conduct a play demonstrating wildlife usefulness to man

Materials Needed:

- 1) Pictures of wildlife
- 2) Praying mantis
- 3) Poster paper
- 4) Aquarium
- 5) Soil from wooded area
- 6) Earthworms
- 7) Section of rotting log or section of soil from wooded area
- 8) Construction paper
- 9) Material for making costumes

Activities:

- 1) Have children make reports on 3 insect-eating birds. Discuss which of these insects are harmful to man.
- 2) Collect praying mantis. Research with class to find out if he is a harmful or helpful insect (feed him cockroaches and grasshoppers).
- 3) Divide the class into groups to make posters showing how some insects are helpful. Examples: a) pollinators (bees), b) soil conditioners (ants), c) predators (praying mantis), d) weed destroyers, e) manufacturers (silkworms, bees), f) food (raised for bird food, eaten by people of some countries).
- 4) Make an earthworm farm (an old aquarium and 5" of forest soil). Put earthworms in and watch them burrow down into the soil. Completely cover from the bright light with cloth or place in dark area. Uncover only to watch the worms. Feed them (lettuce, cereal, corn meal) fresh food daily. Add moisture to the soil frequently. Discuss: a) What do earthworms do for the soil?, b) How are they helpful to man?
- 5) Bring to class a section of rotting log. Invite the children to look for animal life (use magnifying glass). If a rotting log is not obtainable, dig a section of soil from a forest area or under shrubs in the yard. Animal life which might be found include: worms, grubs, snails and slugs, insects, spiders, mites, ticks, ants and eggs. Establish how these insects help man (break down decaying trees, etc.).
- 6) For an art activity: bulletin board. Caption: "What's Bugging You". Have children make bugs from construction paper.
- 7) Let children write their own play about "How Wildlife is Helpful to Man". They may want to make their costumes. also.

Follow-up Activities:

- 1) Let children make a bulletin board showing value of wildlife to man today. They may add things after they study the animal.

- 2) Plan with the class what each child can do to attract birds to his yard. Also, discuss how pupils can protect other helpful animals.
- 3) Art activity: "Love Birds". Two folded hearts, cut both the same size. Decorate one for the body section. Draw a twinkling eye on the other and add a separate beak. Make a small slit across the fold and fit the hearts together.



Evaluation:

After completion of these activities, the pupils can:

- 1) List 10 ways wildlife is helpful to man.
- 2) 50%: Display and explain posters on helpful insects.
- 3) Practice attracting birds and helpful animals to their yard at home.
- 4) Act out their own play demonstrating how wildlife helps man.

Reference Materials:

- 1) Our Animal Resources, Fitzpatrick, Frederick L., Holt, Rinehart and Winston, 1963
- 2) "Berried Treasure for Your Birds", pamphlet
- 3) "How Animals Help Us", film, Coronet Films, 65 E. South Water Street, Chicago, Illinois, 60601
- 4) Praying Mantis, Huntington, Harriet, Doubleday, 1957
- 5) "Attracting Birds in Winter", film, International Film Bureau, 332 S. Michigan Avenue, Chicago, Illinois, 60604
- 6) Birds to Know, Potzger and Friesner, Kenworthy, Publications, New York

EXERCISE #3

Title of Lesson: The Food ChainBehavioral Objectives:

- 1) 70% of pupils will be able to make a diorama of a food chain
- 2) Pupils will be able to keep records of their pet's food and trace it through the food chain
- 3) 25% of students will be able to report to the class on articles about predators and how they relate to the food chain
- 4) 80% of pupils will be able to explain how upsetting the balance of nature may affect man

Materials Needed:

- 1) Materials for diorama
- 2) Paper (poster or mural)
- 3) Filmstrips listed in reference materials
- 4) Magazines (articles) listed in reference materials

Activities:

- 1) Make a diorama of a food chain. You might use some 3D elements and photos. An example: hawk (photo), grass and weeds (dried or live), mouse (small toy), snake (rope).
- 2) Have several children read and report on articles about predators listed in reference materials of this lesson.
- 3) Discuss how upsetting the balance of nature may affect man. What does plague mean? Have you ever heard of the Black Plague? How was this epidemic related to an upset in the balance of nature? How was the disease contracted? What was the natural enemy of the rat? Why didn't people have cats where they lived? At that time and place in history, what did people associate with cats? Ask for volunteers to report on the following examples of upsetting the balance of nature:

EXERCISE #3 (cont.)

- a) Rabbits imported to Australia, b) English Sparrows and Starling brought to America from Europe. Are there evidences in your community of an upset in the balance of nature?
- 4) Explain the symbols O_2 and CO_2 . The gas plants take in is carbon dioxide. What do they breathe out (oxygen)?. Plants and animals also create a food chain or cycle as they breathe.

Follow-up Activities:

- 1) Students may make a mural or poster of a small food chain using food chains in the city, country, jungle, desert, forest or tundra
- 2) Let children bring pets or keep a record at home of the food their pets eat. (Read pet food labels). Trace the animal's food to green plants. Ask the children to think of food chains they are part of. What animals besides humans eat both green plants and other animals?

Evaluation:

- 1) 70% can make a diorama of a food chain.
- 2) 25% reported on articles about predators contribution to the food chain.
- 3) Pupils kept records of pet's food and traced it through food chains to green plants.
- 4) 80% described how the balance of nature might be upset.

Reference Materials:

- 1) Great Chain of Life, Krutch, Joseph Wood, Pyramid Publications, Inc., 1956
- 2) "Birds and Other Animals", chart, National Audubon Society, 1130 Fifth Avenue, New York, New York, 10028
- 3) "Predator Prey", kit, Urban Systems, Inc.
- 4) "Conservation: Food Chain Relationship", transparency
- 5) Ranger Rick's Magazine, "Links of Life: Food Chains", January, 1972
- 6) "Interdependence of Nature: Conservation", filmstrip, animals shown in their different habitats and their adaptations for survival. Predator shown as biological controls. Teacher's Manual included, Eye Gate House
- 7) Natural History Magazine, April, 1972, "The Endless Race of Life"
- 8) "The Balance of Nature", Life Educational Reprint
- 9) "Two African Predators", Ranger Rick, July, 1972

EXERCISE #4

Title of Lesson: Extinction

Behavioral Objectives: After these activities, the class will be able to:

- 1) 90% will be able to tell why and how 3 animals become extinct
- 2) Compare and contrast the Indians to hunters and trappers in their treatment of animals and relate this to extinction
- 3) Name 10 animals that are in danger of extinction
- 4) 70% of children will be able to identify and describe the eagle on the U.S. symbol and describe the buffalo
- 5) Write a short story about an extinct animal

Materials Needed:

- 1) Pictures of Indians
- 2) Pictures of animals that are extinct or scarce
- 3) Emblem of United States
- 4) Encyclopedias, books and magazines about the buffalo
- 5) Pictures of buffalo

Activities:

- 1) Invite, if possible, an early resident of the community to talk to the class on wildlife and fish of earlier times.
- 2) If possible, display Indian pictures to promote discussion of how the Indians in America and the hunters and trappers differed in their use of wildlife. Example: Indians a) hunted only for survival, b) moved about by seasons to supply need for food and clothing, c) gave time lapse in varied locations which gave opportunity for wildlife to be replenished. Trappers and hunters a) hunted for personal profit, b) greed, abuse and waste. Ask: a) Had trappers and hunters practiced Indian methods?. b) What wildlife might not be extinct in our forest today (curlews, bison, passenger pigeon, Carolina parakeet, heath hen)? c) What are species of "endangered wildlife" in the U.S. today (the grizzly bear, whooping crane, sea otter, lake sturgeon, key deer, trumpeter swan, California condor, prairie chicken, everglade kite, bighorn sheep, ivory-billed woodpecker, coyote, elk, sandhill crane, fur seal, whales, salmon)., d) Why is man interested in preserving wildlife (beauty, balance of nature, insect control, etc.)?.
- 3) Arrange a bulletin board displaying pictures of animals which are extinct or scarce. Caption: Have You Even Seen These Animals? Where? Why? Discuss: Have you ever been to an auction and heard the auctioneer crying "going, going, gone?". When the last word "gone" has been said, it means the article being auctioneered is no longer available to the public. The cry "going, going, gone!" can apply to some of the wildlife in our country at this time. Which animals are gone? (Research needed). Which animals are going? (Ask for volunteers to find out which animals are scarce. Endangered species: 297 mammals, 359 birds, 187 reptiles and amphibians and 79 fish). Since 1600, 31 species of animals have become extinct. The rate of extinction has increased four fold since that time.
- 4) Have pupils write a short story as if they were an animal that is extinct or becoming extinct. They should tell why they are extinct and what man should have done to help them.

Follow-up Activities:

- 1) Display the emblem of the U.S. (bald eagle with outspread wings, a shield on its breast, an olive branch in one foot and a sheaf of arrows in the other). Ask: a) What is this?, b) Is it a bird?, c) Is it an emblem?, d) Are there many eagles in our land?, e) Why is there a federal law protecting eagles?, f) Why do you think the bald eagle was selected for the emblem of the U.S.?
- 2) Organize 2 groups (a bird group and a symbol group). Assign the bird group to research: a) importance of eagle to balance of nature, b) description of the bald eagle and American Golden Eagle, c) eagles environment, nesting and food habits. Assign the symbol group to research: a) meaning of symbol, b) why symbols are used, c) how symbols of America's heritage are used, d) where the emblem of the U.S. is used (Great Seal, President's Flag, money).

- 3) Provide encyclopedias, books and magazines with pictures and information about the buffalo. Assign children the research task of finding answers to these questions: a) Describe the number of buffalo in the country long ago., b) What did people do to the buffalo? Why?, c) What happened to the number of buffalo?, d) What happened to keep the buffalo from becoming extinct as the dinosaur did?, e) How did their number increase? For additional information about the buffalo, write to U.S. Department of the Interior Fish and Wildlife Service, Washington, D. C., 20240
- 4) Sing Pete Deeger's Song, "Where Have All the Flowers Gone", changing some of the word's to fit wildlife.

Evaluation:

- 1) 90% of children can tell how and why 3 animals became extinct.
- 2) Pupils can compare and contrast the Indians to hunters and trappers in their treatment of animals.
- 3) The students identified 10 animals that are endangered of becoming extinct.
- 4) The children wrote a short story about an extinct animal.
- 5) 70% did research on U.S. symbol and American Buffalo.

Reference Materials:

- 1) "Mutual of Omaha's Kingdom", chart, 22"x30", these animals are threatened with extinction, Mutual of Omaha, Omaha, Nebraska
- 2) "The American Alligator", National Parks and Conservation Magazine, May, 1972
- 3) "The Way to Extinction", Audubon Magazine, January, 1972
- 4) For free materials write to: National Wildlife Federation, 1412 Sixteenth Street, N.W., Washington, D.C., 20036
- 5) "Vanishing Birds", film, Picture Film Corporation, 29 E. 10th Street, New York, New York, 10003
- 6) The American Buffalo, Pearson, Wanda Lynn, Steck-Vaughn Co., 1961
- 7) The Last Eagle, Mannix, Daniel P., McGraw-Hill, New York
- 8) "The Bald Eagle", pamphlet, available at the Bourbon County Schools Materials Center
- 9) "The American Buffalo", pamphlet, available at the Bourbon County Schools Materials Center
- 10) For further information write: Wildlife in Danger, James Fisher, Noel Simon, Jack Vincent, Viking Press, New York, 1969
- 11) For further information write: World Wildlife Fund, U.S. Office, Suite 728, 910 Seventeenth Street, N.W., Washington, D.C., 20009
- 12) "Endangered Species", pamphlet, available at the Bourbon County Schools Materials Center

EXERCISE #5

Title of Lesson: Reasons for Our Vanishing Wildlife

Behavioral Objectives: After completion of this exercise, the students should be able to:

- 1) List 5 ways in which chemicals harm wildlife
- 2) Describe how these pesticides affect the food chain
- 3) Identify 5 ways in which man has destroyed animal habitats
- 4) Read news articles concerning chemical control with more understanding

EXERCISE #5 (cont.)

Materials Needed:

- 1) Articles on pesticides (see reference materials)
- 2) Filmstrips and slides listed in reference materials

Activities:

- 1) Research on the effects of pesticides on wildlife (bud, eggs, fish, food chain, etc.). Briefly, go back to the lesson on the Food Chain. One important point about food chains is that whatever goes into the soil or water or plant may spread through the bodies of whole chains of animals. As the pesticide or poison moves up the chain, it becomes more and more concentrated. We humans also receive pesticides and other poisons in food chains. Even some canned and packaged foods are being found to be contaminated.
- 2) Promote a discussion of the affects of wildlife by water pollution and by poisonous chemicals in the environment.
- 3) Motivate a discussion on how animals habitats are being destroyed. Also, mention fashion endangers some wildlife: alligators, sea turtles, vicunas and big cats (50 years ago, there were 40,000 tigers; today, only 2,800). The class may draw pictures of an animal habitat or bring in VACANT homes. Example: wasp nest. Bring about an awareness of how man destroys the habitat of many animals through construction, chemicals, hunting, etc.

Follow-up Activities:

- 1) Throughout the entire year, help children build an interest in current news articles about vanishing wildlife, due to chemicals, etc.
- 2) Have children research to find articles on mercury found in fish and how this may affect the people who eat them.

Evaluation:

After completion of these activities, the class can:

- 1) List 5 ways in which chemicals harm wildlife.
- 2) Identify 5 ways man has destroyed animal habitats.
- 3) Explain how pesticides affect the food chain.
- 4) Read news articles and relate them to the destruction of the food chain.

Reference Materials:

- 1) "Land Use", Happy Hunting Ground Magazine, May, 1972; also, "Fish and Wildlife Law Enforcement" in same magazine
- 2) "Ecology: A Wild Idea, Is It?", Ranger Rick Magazine, May, 1972
- 3) "Vanishing Wildlife: The Mammals", Life Educational Reprint
- 4) "The Golden Eagle", Ranger Rick Magazine, January, 1972
- 5) "Return of the Spoonbill", Ranger Rick Magazine, April, 1972
- 6) International Wildlife, July/August, 1972
- 7) "The Case Against Hard Pesticides", pamphlet, National Wildlife Federation, Ralph A. MacMullan
- 8) Pesticides: The Mist of Death, Schwartz, Pendulum Books, Inc., 1971
- 9) Once There Were Bluebirds, Martin, Bill Jr., Bowman, 1970
- 10) "Conservation of Wildlife", filmstrip, Teacher's Guide included, Eye Gate House

- 11) "Fish Resources", slides, script and Teacher's Guide included, J. Weston Walch
All of the above Reference Materials are available at the Bourbon County Schools Materials Center.
- 12) "Pesticides", filmstrip, Society for Visual Education, available at the Bourbon County Schools Materials Center
- 13) "Chemical Pesticides", Instructor Magazine, April, 1971
- 14) "Vanishing Wildlife: The Birds", Life Educational Reprint, available at the Bourbon County Schools Materials Center
- 15) "Pollution by Pesticides", pamphlet, available at the Bourbon County Schools Materials Center

EXERCISE #6

Title of Lesson: Conservation: Hunting Laws and Sanctuaries

Behavioral Objectives: After the following activities, the students will be able to:

- 1) Tell why there is a need for hunting licenses and hunting laws
- 2) Make decisions during a mock congress about new proposals for wildlife regulations
- 3) Write a short story, poem or paragraph
- 4) Prepare a bulletin board display showing wildlife needs and ways people can help keep them safe
- 5) Orally describe the value of regulations and research concerning wildlife

Materials needed:

- 1) Hunting licenses and laws
- 2) Sporting magazines
- 3) Pictures of wildlife
- 4) Copies of 4-H Soil and Water Conservation Unit 3: Wildlife
- 5) Poster paper or any large paper
- 6) Construction paper

Activities:

- 1) Display hunting licenses which children have been ask to bring. With an opaque projector or transparency for an overhead projector, have the students examine the dates and limitations on several kinds of hunting licenses (teacher may find Kentucky hunting dates in Happy Hunting Ground, May, 1972).
- 2) The class may want to invite a game warden to their classroom for further discussion of the hunting laws and licenses.
- 3) Have the students locate an article or item in some of the sporting magazines which demonstrate the value of regulations and research concerning wildlife management. Then, have them plan and present a brief analysis to the class.
- 4) Have the class research on the Atlantic Treaty. What does it do? Why? Are salmon useful?
- 5) Have the entire class conduct a role playing activity. Set up the class as one of the houses of Congress of United Nations and make decisions and laws to protect wildlife. Facts for teacher: The United Nations is working on these goals at the present time.

Setting aside "islands" still largely undisturbed by man as reserves to be protected forever by the owning state under a proposed World Heritage Foundations. Regulating the export, import and transit of endangered species. Protecting the whale, polar bear, Atlantic salmon and other oceanic wildlife: the heritage of all nations.

- 6) Research on Animal Sanctuaries and Preserves. Write short paragraph on each.
- 7) If possible, obtain copies of 4'H Soil and Water Conservation Unit 3: Wildlife. These contain many summary exercises.

Follow-up Activities:

- 1) Children may make a bulletin board display showing: a) pictures of wildlife, b) needs of wildlife (shelter, food, water and living space), c) ways wildlife helps people (recreation, insect control, etc.), d) ways people can help wildlife (provide plants for food and shelter, obey hunting laws).
- 2) Write a short story, poem or paragraph using John Keat's quotation in Endymion, "A Thing of Beauty is a Joy Forever" (relate it to wildlife).
- 3) Have a classroom poster contest "Be Kind to Animals". Use humor in illustrative posters. Examples: a) "Kindness Adds Up" shown on a poster showing 6 bouncy rabbits, b) if the animal were a mule, the slogan could be "Don't be Stubborn: Love Me", c) picture of a bear saying: "I Can't Bear Unkindness".

Evaluation:

- 1) Pupils can tell why there is a need for hunting laws and licenses.
- 2) Students stated new ideas about wildlife protection.
- 3) Children prepared a bulletin board display.
- 4) Pupils can write a short story or poem.
- 5) Students were able to explain the value of regulations and research concerning wildlife.

Reference Materials:

- 1) "Nation Outlook", Audubon Magazine, January, 1972, available at the Bourbon County Schools Materials Center
- 2) "Sanctuary for the Tule Elk", National Parks and Conservation Magazine, June, 1972, available at the Bourbon County Schools Materials Center
- 3) Write to: Land Between the Lakes, Tennessee Valley Authority, Golden Pond, Kentucky and ask for information on Conservation of the Bald Eagles
- 4) "Habitat Improvement", pamphlet, available at the Bourbon County Schools Materials Center
- 5) "Conservation and Balance in Nature", film, International Film Bureau, 332 S. Michigan Avenue, Chicago, Illinois, 60604
- 6) "More Wildlife Through Soil and Water Conservation", pamphlet, American Institute of Biological Science, 2000 P. Street, N.W., Washington, D. C., 20006
- 7) "Wildlife and the Human Touch", film, U.S. Department of Agriculture, Motion Picture Service, Washington, D. C., 20250

SPECIAL EDUCATION EXERCISE PLANS

Incorporating Environmental Studies

Sources Consulted in Developing:

Environmental Education: Objectives and Field Activities
Paducah, Kentucky

A Curriculum Guide for Nature Study in the Elementary School
McKinley Elementary School
Abington, Pennsylvania

Teacher's Curriculum Guide to Conservation Education
Edited by Matthew J. Brennan
J. G. Ferguson Publishing Company
Chicago, Illinois

People and Their Environment
Matthew J. Brennan
J. G. Ferguson Publishing Company
Chicago, Illinois

Instructor
Aug.-Sept., 1969
Harcourt, Brace and World, Inc.
Instructor Park, Dansville, New York

Pollution
Mine Publishing, Inc.
25 Groveland Terrace
Minneapolis, Minnesota 55403

Outdoor Laboratory
Matthew J. Brennan
J. G. Ferguson Publishing Company
Chicago, Illinois

Compiled by:

Mrs. Marjorie Cleaver
Special Education Instructor
Bourbon County Junior High School
Paris, Kentucky 40361

Title of Lesson: Water In Your Home

Behavioral Objectives: At the conclusion of this exercise, each child should be able to:

- 1) List reasons why people, wildlife and crops need water
- 2) 80% will be able to list the uses of water in the home
- 3) Develop an awareness that water is found in all foods

Materials Needed:

- 1) Watermelon or tomato
- 2) Potted plant
- 3) Charts for keeping records
- 4) Measuring cup
- 5) Hot plate
- 6) Scales

Activities:

- 1) Name some of the ways water is used in your home (example: for drinking by people and animals, bathing, washing clothes, removing wastes, watering lawns, plants and trees, fishing and boating, air conditioners)?
- 2) Let children keep a record of the amount of water they drink in a day.
- 3) Discuss with the children what would happen to our wildlife and crops if all the water was polluted. (Bring in facts that germs cause diseases which kill wildlife and crops as well as people.)
- 4) Can we find out how much water there is in a watermelon or tomato? Weigh a piece of watermelon or tomato before and after heating it. Figure the amount of water.
- 5) Examine a potted plant. Ask: What do you think it needs?, How might we find out how important water is to this plant? Let someone water it. Observe changes made in looks and growth of the plant.
- 6) Ask: Who likes the rain?, Why do you like it?

Read 2 verses of poem, "April Rain"

It is not raining rain to me,
It's raining daffodils;
In every dimples drop I see
Wildflowers on the hills.
A health unto the happy!
It is not raining rain to me,
It's raining violets.

Robert Lovernman

- 7) Make a chart showing the amount of water it takes to use in every-day living (example: 3 gallons to flush a toilet, 30 gallons to fill a bath tub to a depth of 6 inches, commercial air conditioners use enough water to supply the daily needs of 30,000 peoples' dishwashers).
- 8) Let children list what they ate for breakfast. Find out what foods contained water. Then name foods that have had the water removed (frozen juices, condensed soup). Ask: How can we restore water to dehydrated foods?

Follow-up Activities:

- 1) Children investigate at home with other foods (apples, potatoes) to find out how much water is in living things and report their findings.
- 2) Write a story titled "The Community with Little Water".
- 3) Read the poem, "The Rime of the Ancient Mariner". The students find "Water, water everywhere, Nor any drop to drink".
- 4) Children can do research to find out the amount of water needed for: a) an individual (5 pts. a day), b) horse (15 gallons), c) pet dog or cat, d) birds, etc.

Evaluation:

After completion of these activities, the pupils were:

- 1) Able to list 8 reasons why people, wildlife and crops need water.
- 2) 80% of the class were able to list uses of water in the home.
- 3) The students demonstrated their understanding that all foods contained water.

Reference Materials:

- 1) Conservation Curriculum Guide, gr. 4-6, "Life Depends on Water", p. 24
- 2) Water: Our Most Precious Resource, p. 53
- 3) "Ranger Rick's Nature Magazine"
- 4) "Needed Clean Water", pamphlet, Resource Bureau, 300 E. 44th St., New York, New York, 10017
- 5) What is Water?, Hagaman, Adaline P., Benefic Press, Chicago, 1960
- 6) Water All Around, Pine, Tillie S., McGraw-Hill, New York, 1966
- 7) "Rainshower", film, Churchill Films, 6671 Sunset Blvd., Los Angeles, California, 90025

Above materials (1-7) are found in the Bourbon County Schools Materials Center.

EXERCISE #2

Title of Lesson: Water in Industries and Agriculture

Behavioral Objectives: After this exercise, the students will be able to:

- 1) Estimate the amount of water per day needed for work in a factory
- 2) Recognize that industry is the largest user of water
- 3) Discuss the amount of water needed for irrigation in your county
- 4) Discuss agricultural pollution of water resources

Materials Needed:

- 1) Maps of county and state
- 2) Apple
- 3) Knife
- 4) Charts
- 5) References

Activities:

- 1) Go on a trip to an industrial plant in your community and find out how much water is used for one industry.

- 2) Locate and list all the possible sources of water for your community (example: lakes, rivers, wells, ponds, streams, reservoirs, etc.).
- 3) Dramatize how the great volume of water in the biosphere compares with the small amount suitable for drinking; show the class an apple and ask them to imagine it as the earth. Cut the apple into quarters. Show one quarter and announce that it represents the land area of the planet. Set it aside. Ask: How much of the earth contains water area (3/4)? How much of the 3/4 shall we call oceans (about 1/2 of the apple would represent oceans)? Set this aside, too. Ask: How much water is left now that might be suitable for drinking?, What bodies of water are included in this 1/4 left?, Could we get drinking water from the ditches (no, so set aside another thin slice as unsuitable)?, Could we get drinking water from the marsh?, From the Salt Lakes? Continue questioning and setting aside slices of the apple until only a sliver is left. Hold it up. There is really just about this much drinking water in the world (eat the sliver of apple). What would happen to all of us if it disappeared this fast (humans can live without water for about 3 days)?
- 4) Draw a map of Kentucky showing the use of industrial water by regions. Let children draw a circle to indicate where water is used in industry.
- 5) Make a graph showing billions of water used per day in industry, irrigation, domestic and livestock.
- 6) Make a list of all the things connected with agriculture that might pollute the water. Let each child take one topic from the list and write an essay on how it pollutes the water.

Follow-up Activities:

- 1) Let children participate in the seeding and mulching of the school yard to protect soil from washing and to make an attractive lawn.
- 2) Form an Ecology Club in your school and let children watch for gullied slopes in parks and recreation grounds. Later, do some planting and seeding.
- 3) Make a study of the water problems to find out if there is a threat to the future economy of the community.

Evaluation:

Each student:

- 1) Estimated the amount of water necessary for a factory.
- 2) Was able to see through this exercise that industry is the largest user of water.
- 3) Participated in the study of the amount of water used for irrigation in their county.
- 4) Should be able to participate in the discussion of agricultural pollution of natural resources.

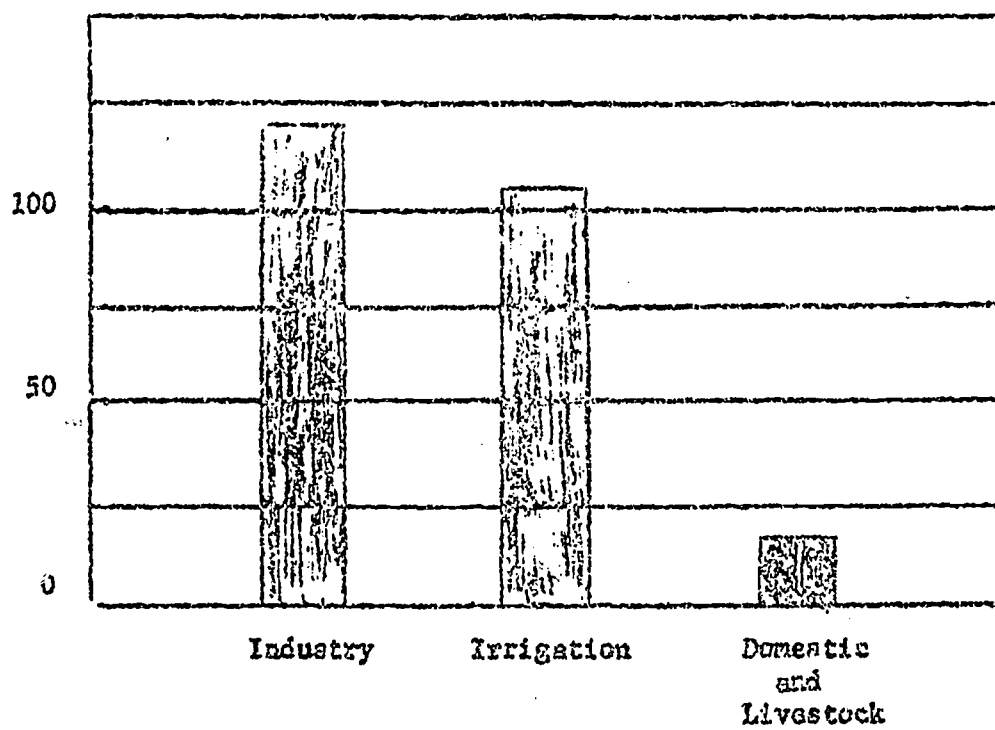
Reference Materials:

- 1) "Water for the High Plains", film, 14 min., color, free, Office of Chief Engineer, Bureau of Reclamation, Building 67, Denver Federal Center, Denver, Colorado. 80255

- 2) Water and Industry, Department of Interior, Washington, D. C.
- 3) National Wildlife Federation, E. Q. Index, p. 4
- 4) Catalyst, Vol. II, No. I
- 5) Farmlands and Water Quality Soil Conservation, Agriculture Pollution of Water Resources
- 6) Showdown, Federal Water Pollution Control Administration, U. S. Department of Interior
- 7) Running Water, Mine Publications, Inc., 25 Groveland Terrace, Minneapolis, Minnesota, 55403
- 8) Air and Water Pollution, Washington Square Press
- 9) What You Can Do About Water Pollution, free, Federal Water Quality Administration Office, Ohio Basin Office, 4676 Columbia Parkway, Cincinnati, Ohio, 45226
- 10) Posters from above address (9): "Stop Water Pollution: It's Later Than You Think", 11"x14" poster board (3 colors)
- 11) Look Around You, Scholastic Earth Corps, Environmental Awareness, Book I
- 12) Clean Water, Isaac Walton League of America, 1326 Waukegan Road, Glenview, Illinois, 60025
- 13) Water, National Wildlife Federation, 1412 16th St., N. W., Washington, D. C., 20036 (10¢/copy)

Above materials (1-13) can be obtained from the Bourbon County Schools Materials Center.

EXERCISE 52



Title of Lesson: The Hydrologic Cycle

Behavioral Objectives: After completion of this exercise, the students should be able to:

- 1) Develop an understanding of the hydrological cycle
- 2) Compare the extent to which both the processes of nature and the activities of man depend on water
- 3) Recognize that the earth's limited water supply is constantly circulating

Materials Needed:

- 1) Paper towel
- 2) Water
- 3) Plastic bag
- 4) Plant
- 5) Sand
- 6) Aquarium
- 7) Glass baking dish
- 8) Ice cubes
- 9) Cookie tray
- 10) Tea pot
- 11) Hot plate
- 12) Catch tray
- 13) Water sprinkler
- 14) Foil
- 15) Finger paint
- 16) Cardboard box
- 17) Water collection tray
- 18) Leafy branch

Activities:

- 1) Develop an understanding of the prefix, hydro, by writing the word hydrant on the board. Inquire about its meaning. Add the word hydroplane and ask for a definition. Establish that hydro refers to water. Then ask questions: a) What do you think hydroelectric power is?, b) What do you do when you hydrate something?, c) What if you de-hydrate it?, d) Can you imagine what hydrology might be?, e) What is a cycle?, f) What would a hydrologic cycle be (example: wet a paper towel and hold it up--If I hung this on a line on a nice, sunny day, what would happen to the water, where would it go?)?, g) Write the word, evaporation (underline vapor). What is vapor?, Is vapor a liquid, a solid, a gas?, Where would the vapor from the wet towel and from the surfaces of lakes and oceans and from streets and buildings go after a rainstorm?, h) Tie a clear, plastic bag around a small, leafy branch. What happens inside?
- 2) Discuss the formation of a cloud. (Stress that when water is converted from a liquid to a gas, it is purified.)
- 3) Write the word condensation on the board. Ask: What happens to the water vapor high in the atmosphere? When water vapor condenses, it becomes a liquid again and falls as rain. Could it fall as a solid?, What about ice, snow and hail?

- 4) Write the word precipitation on the board and explain that this word best describes all the forms that water takes when it falls to earth.
- 5) Have children repeat the 3 words which describes the hydrologic cycle using circular arm motions. Draw a circle on the board to show the cycle.
- 6) Let children discuss what happens to water when it hits the ground, run off water, water that percolates through the soil, water that fills reservoirs, water that drops into lakes, oceans, etc. Ask: Can we say that because of the hydrologic cycle we never really lose our water?, Does nature help to purify our water?
- 7) A simple demonstration of our world's closed water system can be created in the classroom illustrating both evaporation and condensation.
- 8) Demonstrate how water flows, due to land elevations, from high mountains, through streams, into swamps, lakes, rivers and finally to the sea. Possibilities of land erosion and water pollution can also be noted. Water sprinkled on the foil will flow down "gullies", collect in "lakes", overflow these into large streams or "rivers", on the way to collection tray (ocean). Paint will wash off where water flows leaving a chart of a "watershed".

Follow-up Activities:

- 1) Ask the children to imagine that each of them is one single rain-drop. Have them write a creative story, telling their adventures in each area of the hydrologic cycle. These could be put into the form of a booklet for display during an open house.
- 2) Establish a water table using sand, water and an aquarium or glass baking dish. Find out how underground water fits into the cycle. What activities lower the water level in many places?, Why should people be concerned about water table?
- 3) Construct a mural showing the hydrologic cycle.
- 4) On the board write, "The water you bathe in tonight may contain some of the same water that Moses was hidden in as an infant or that Daniel Boone crossed on his trip west." Instruct children to read the comment carefully and then write one or two paragraphs explaining its meaning and why they think it is true or false (hydrologic cycle).

Evaluation:

After completion of this exercise:

- 1) 75% of the class were able to demonstrate by drawing the hydrologic cycle.
- 2) The students were able to recognize that the processes of nature and the activities of man depend on water.
- 3) The students were able to recognize that the earth's limited water supply is constantly circulating.

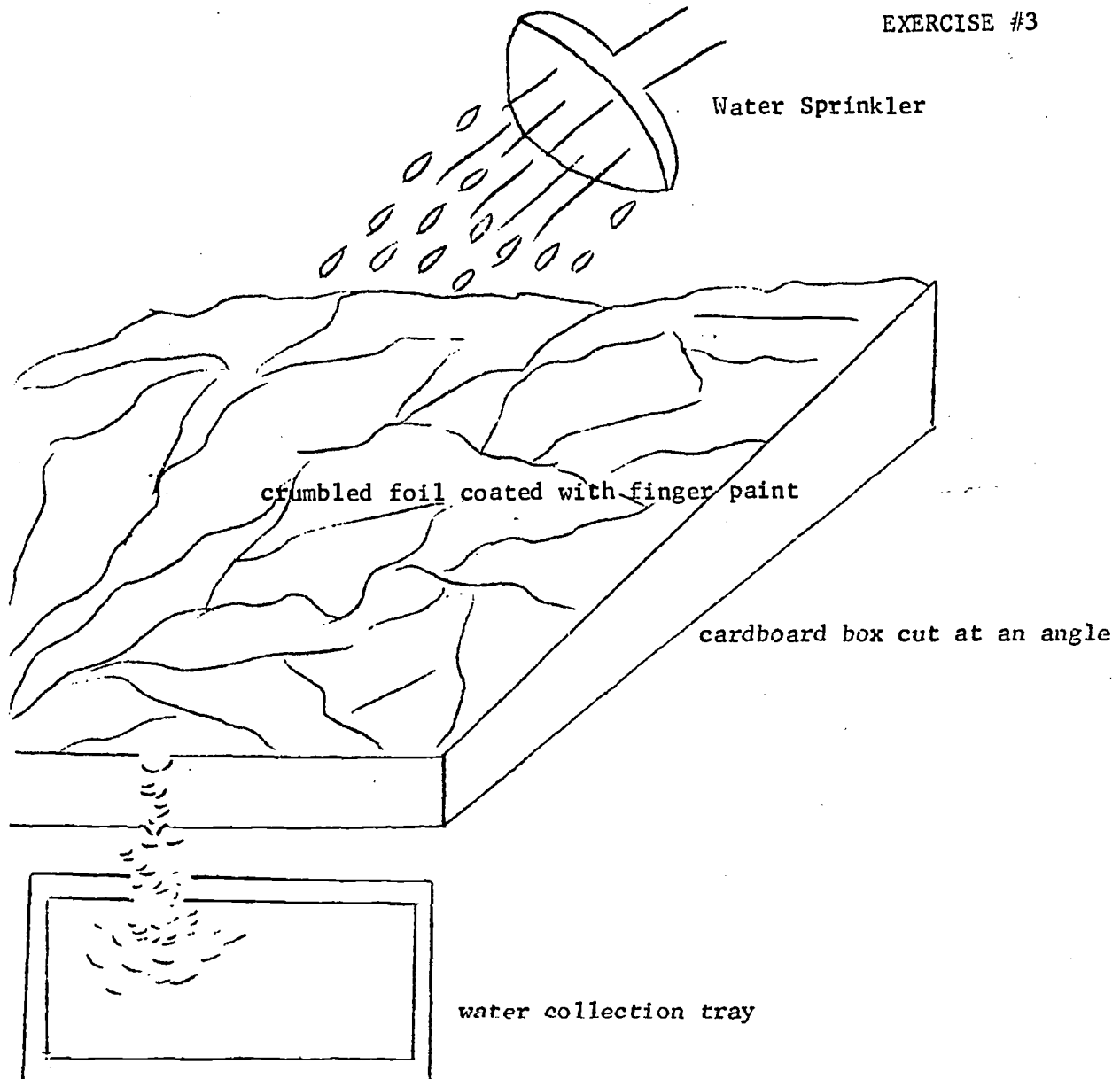
Reference Materials:

- 1) Water, Riches or Ruin, Bauer, Helen Doubleday
- 2) Realms of Water, Cycle in Nature, Kuenen, Philip H.

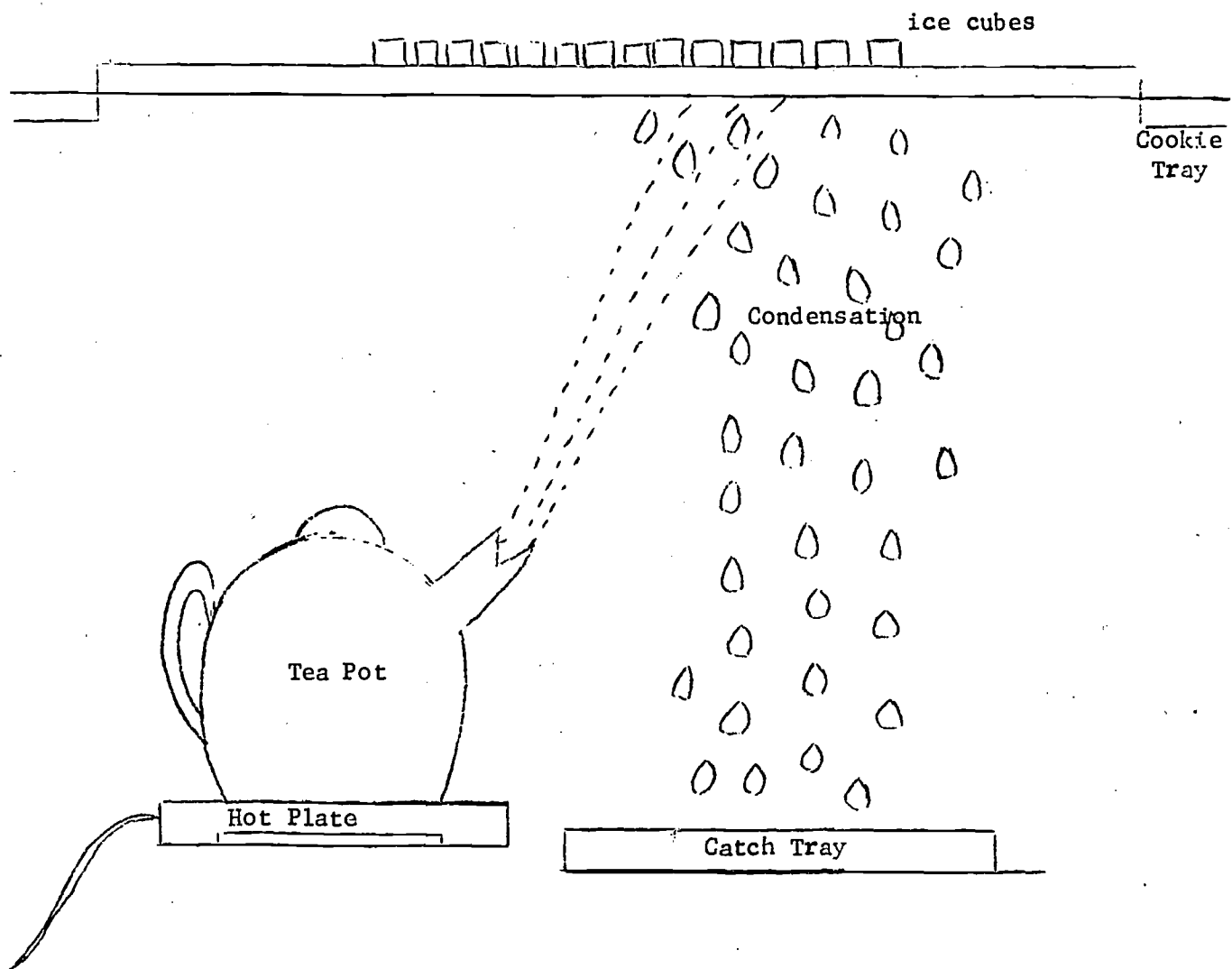
- 3) A Primer on Ground Water, Baldwin, Helen L. and McGuinness, C. L., 1963
- 4) U. S. Geological Survey, Washington, D. C., 20242
- 5) Our Natural Resources, Study Guide, The Garden Club of America
- 6) Glaciers: A Water Resource, 23pp. illus., Free Information Office, U. S. Geological Survey, Washington, D. C. 20242
- 7) Why is the Ocean Salty?, Free Information Office
- 8) Water of the World, Free Information Office
- 9) Hydrologic Cycle, Free Information Office
- 10) What is Water?, Free Information Office
- 11) Water and Industry, Free Information Office
- 12) Natural Steam for Power, Free Information Office
- 13) Federal Pollution Control Programs: Water, Air and Solid Wastes, Bureau of National Affairs, Washington, D. C., 20037
- 14) "Natural Water Cycle", pamphlet, U. S. Department of Agriculture, Forest Service, South Building 12th St. and Indiana Ave., S. W., Washington, D. C., 20250
- 15) "Water and What It Does", film, Encyclopedia Britannica, 1150 Wilmette Ave., Wilmette, Illinois, 60091

Some of the above materials can be obtained from the Bourbon County Schools Materials Center.

EXERCISE #3



99
EXERCISE #3



The temperature can be varied to show the effect of atmosphere changes on precipitation.

Title of Lesson: Water Pollution

Behavioral Objectives: At the conclusion of this exercise, each student will show that he has some understanding of the problems of water pollution by:

- 1) Recognizing ways of preventing water pollution
- 2) At least 75% of the class will be able to tell when water is unsafe to use
- 3) Discover that clean water is important to living things
- 4) Recognizing that less than 1% of the earth's water is usable and that 99% is salty oceans, glaciers and polar ice caps

Materials Needed:

- 1) Water glass of clear water
- 2) Water glass of dirty water
- 3) Pictures of polluted streams
- 4) Books
- 5) Detergents
- 6) Trash that pollutes the water
- 7) Magazines
- 8) Oaktag

Activities:

- 1) Introduce the word pollution. Ask children to smell the 2 containers of water. Could fish and plants live in polluted water?
- 2) Show pictures of polluted streams and pictures of clear, sparkling streams of water.
- 3) Take the children on a field trip to a polluted stream in your area.
- 4) Observe heavy rainfall as it carries the water and waste into the streams.
- 5) Visit a clean, farm pond.
- 6) Make a scrapbook of pictures showing how people, animals and plants use clean water.
- 7) Play a game of "Ad--Verse". The first player starts to tell a story of water pollution in a rhymed jingle: "I saw a stream as sweet as cream." The second player: "It was clear and blue and sparkling, too." The third player might add: "The stream soured and algae flowered." Continue the jingle until the story ends. The jingle could be written on the board and copied to be used again.
- 8) Show some detergents. Lead children to the awareness of the amount of detergents that go "down the drain". Ask what happened to the sudsy waste water at the sewage plant. Then ask what would happen to fish or plants in such water.
- 9) Use large pieces of oaktag to make collages of the causes of water pollution (work in groups). Children can bring in items and arrange them in interesting ways before gluing them on the oaktag. Items could include: labels of detergent bottles, granules of detergent (stuck on with water), piece of a fertilizer bag, sprigs of dried algae, fish bones, bottle caps, etc. The collages would be displayed on a hall or room bulletin board. The caption might read, "Where Has All the Beauty Gone?". At the lower right hand side of the bulletin board designate a specific polluted body of water in your area: lake, pond or river.

Follow-up Activities:

- 1) Make a graph showing how much of the earth's water supply is usable.
- 2) Ask for antonyms to describe polluted water (example: sparkling, crystal, clear, pure).
- 3) List adjectives on the chalkboard: smelly, slimy, muddy, dirty, green, rusty, brownish.
- 4) Hold a panel discussion about the effects of water pollution.
- 5) Write a letter to the P.T.A. asking them to plan a water pollution discussion at one meeting.
- 6) Produce a program for radio or television about your community's water pollution problems. Present it live or pre-recorded before other classes.
- 7) Students could write an essay on what would happen if garbage was thrown in our streams.

Evaluation:

Each student demonstrated his knowledge of water pollution by:

- 1) Listing 8 ways of preventing water pollution.
- 2) 75% of the class were aware of the fact that pollution exists and that its cause and cures affect each person.
- 3) List ways that clean water is important to living things.
- 4) The students recognized that less than 1% of the earth's water is usable and that 99% is salty oceans, glaciers and polar ice caps.

Reference Materials:

- 1) Instructor, Aug.-Sept., 1969
 - 2) The Wastemaker, Pachard, Vance and McKay, Davis
 - 3) Our Polluted World: Can Man Survive?, Perry, John, Franklin Watts Co.
 - 4) Sparkling Water, Shuttlesworth, Dorothy E., Doubleday and Co.
 - 5) The Grade Teacher, Oct., 1970
 - 6) Fresh and Salt Water, Cadbury, B. Bartram, Monkato Creative Education Society
 - 7) Pollution: Examining Your Environment, Mine Publications, Inc., 25 Groveland Terrace, Minneapolis, Minnesota, 55403
 - 8) River of Life, 96 pp., \$2.00, dozens of full color photos, Superintendent of Documents, G.P.O. (Government Printing Office)
 - 9) Pollution: The Waters of the Earth, Jones, Claire; Gadler, Steve; Engstrom, Paul H., Lerner Publications, 1971
 - 10) Our Troubled Waters, Sorvall, Vivian, Pendulum Books, 1971
- Some of the above materials can be found in the Bourbon County Schools Materials Center.

EXERCISE #5

Title of Lesson: Water Treatment: Before Using, After Using

Behavioral Objectives: At the conclusion of this exercise, the students should be able to:

- 1) Distinguish the difference between pure and impure water
- 2) Recognize the various sources of our water supply
- 3) Explain reused water and the hydroelectric power plant

Materials Needed:

- 1) Sample of pure drinking water
- 2) Plastic pill container
- 3) Sifter
- 4) Cotton
- 5) Gravel
- 6) Muddy water
- 7) Sand

Activities:

- 1) Read "April Rain Song":
Let the rain kiss you
Let the rain beat upon your head
With silver liquid drops,
Let the rain sing you a lullaby.

The rain makes still pools on the sidewalk,
The rain makes running pools in the gutter,
The rain plays a little sleep song on our roof at night,
And I love the rain.

Langston Hughes

- 2) Place labeled samples of pure drinking water in plastic pill container on the display table. Inquire if anyone noticed any particular insects in the clean water of the reservoir. (The larvae of the black may fly is found in clean water.)
- 3) Obtain a dime store sifter. Cover the screen with a layer of absorbent cotton, next a one-inch layer of fine sand, a one-inch layer of coarse sand, and then a one-inch layer of gravel. Set the sifter over a jar and slowly pour muddy water into it. Ask: Does the water look clean when it comes out of the bottom (the water may look clean, but still contains germs)? Compare this with sewage and waste treated in regular treatment plants.
- 4) Take a trip to the town's water treatment plant. Find out what is done to make the water pure.
- 5) Have children summarize the facts learned in the interview at the water plant (example: reused water, filtration, number of gallons used per person per day and source of water supply).

Follow-up Activities:

- 1) Make drawings showing the filtration at the plant.
- 2) Have each child to construct a booklet consisting of about 20 lined pages and an oaktag cover. Ask each child to imagine that he is a body of water (a pond, stream, lake, brook, river) and to keep a daily account (a diary) of things that happen to him. As the unit progresses, the diaries reflect the learning that is taking place. Have each child give his diary a name such as: "Little Happenings In Big River", "My Name is Crystal Lake", or "Sparkling Water".
- 3) Play the game, "Dirty Water: The Water Pollution Game". Each player assumes the role of a water pollution control official who is responsible for stocking his lake. Throughout the game, he must learn to anticipate possible pollution, attempt to avoid the problem of over-population, manage his finances efficiently and consider the

problem as possible pollution coming from upstream. A player wins the game by controlling water pollution successfully and, thereby, being the first to completely stock his lake.

Evaluation:

At the conclusion of this exercise, students were able to:

- 1) Distinguish the difference between pure and impure water.
- 2) List the various sources of our water supply.
- 3) Explain how water could be reused and the hydroelectric power plant.

Reference Materials:

- 1) A Primer of Waste Water Treatment, 55¢, Superintendent of Documents, U. S. Government Printing Office, Washington, D. C., 20402
 - 2) International Wildlife, July-Aug., 1972, p. 24
 - 3) National Wildlife Federation, 1971 E. Q. Index
 - 4) "Kentucky Happy Hunting Ground", May, 1972
 - 5) Conserving Our Waters and Clearing the Air, American Petroleum Institute, Study Manual
 - 6) Instructor, April, 1972, p. 104
 - 7) Spoiled Tomatoes, Bowmar
 - 8) "Dirty Water: The Water Pollution Game", Urban Systems, Inc., 1023 Massachusetts Ave., Cambridge, Massachusetts, 02138
 - 9) "Freshwater Pollution", filmstrip, Ward's
 - 10) "The Muddy Raindrops", filmstrip, Society for Visual Education
 - 11) "Pollution: The Great Lakes", filmstrips, Part I, II, III, Time-Life Building, New York, New York, 10020
 - 12) "Water Pollution", filmstrip, J. Weston Walch
- The above materials can be obtained from the Bourbon County Schools Materials Center (1-12).

EXERCISE #6

Title of Lesson: What Can You Do to Help Save Our Water Supply?

Behavioral Objectives: At the conclusion of these activities, the student should be able to:

- 1) List 5 ways they can conserve water
- 2) Show an understanding of human needs and desires and realize that they are greater than the resources available to meet the expressed needs
- 3) Participate in water conservation in their county

Materials Needed:

- 1) Maps of Kentucky and the United States
- 2) Canteen filled with water
- 3) Film on water
- 4) Charts

Activities:

- 1) Make a list of the ways you can use water more carefully: a) How

- much water is used to wash the family car? Get a watch with a second hand. Time how long it takes to fill one gallon bucket with water from a hose. Then time how long it takes to wash the car from a hose. How many gallons used (children can see that it will conserve water to use water in a pail)., b) A leaky faucet losing one drop of water each second wastes 4 gallons of water a day, so close faucets tightly., c) Don't let the water continue running while brushing your teeth or washing dishes., d) Don't run water just to get a cool drink (keep a container of water handy in the refrigerator)., e) Sprinkle lawns and flowers in early morning or evening (less water is lost at these times).
- 2) Children can figure how much water you use a month, a year. Ask: How would you like to carry that much from a well?
 - 3) Let the children record how many times they turn on a faucet in one day. Record the total for the class. Try to figure out how you can cut down on the number of times in order to conserve water.
 - 4) Teacher brings in a canteen filled with water and explains that this canteen is an allotment of water for all purposes for one day. "I'm going to try to keep within the allotment. Will you try this with me?"
 - 5) Use a map of Kentucky showing location of population. Use another map showing water resources. Color with blue all the areas of water.
 - 6) Have children list all the destructive forces of water.
 - 7) Show film on water.
 - 8) Children could write an autobiographical questionnaire to examine the students behavior in regard to water pollution. Use questions such as: Have you ever thrown refuse on the ground?, Have you fixed a leaky water fixture for your home?, Have you ever asked your mother to change her laundry detergent?
 - 9) Let children list things they can do to improve water pollution in the home, and on outings.

Follow-up Activities:

- 1) Children can do research work to find out the civilizations that were destroyed by depleting their soil and water resources. Then have them try to list things that would have prevented this.
- 2) Make a list of ways to solve problems in water conservation now and in the future (example: a) improve water treatment, b) use of additional ground water, c) provide ground storage, d) suppression of evaporation to increase net run off, e) desalination of water.
- 3) Students pretend that as adults of the 21st century, they have solved all major water problems. Let them write about what they did as citizens and tax payers to restore health and beauty to their environment.
- 4) Children can sing the folk song by Barbara Emberley, "One Wide River to Cross" (see Favorite Folk Tales).
- 5) Read the poem:
The voice that beautifies the soil!
The voice on high,
The voice of the rolling thunder,
Above the darkening clouds
Again and again it is heard,
The voice that beautifies the soil!

(Navajo Chant)

Evaluation:

After the completion of these activities, the students could list:

- 1) 5 ways to conserve water.
- 2) Students were able to show an understanding of human needs and desires and became more aware that the needs are greater than the resources available.
- 3) Participated in water conservation in their county.

Reference Materials:

- 1) "Ten Little Rain Devils", pamphlet, S. C. S. (Soil Conservation Ser.)
 - 2) "Water and the Land", U. S. Health, Education and Welfare, pamphlet
 - 3) "Everything Needs Water", pamphlet
 - 4) "Will We Have Enough Water?", pamphlet, Humble Oil Refining Co.
 - 5) "A Fresh Water Sale", pamphlet, adv. from American Petroleum Institute, 1271 Ave. of the Americas, New York, New York
 - 6) Silent Spring, Carson, Rachel.
 - 7) Natural History, Apr., 1972, p. 48
 - 8) Instructor, Mar., 1972, p. 116
 - 9) Water Pollution, Berg, George G., p. 28, Recycling Waste Water
 - 10) The Sea Around Us, Carson, Rachel
 - 11) Junior Science Book of Water, Peterson, Ottis, Scarsdale, Garrard, 1966
 - 12) "Clean Water: It's Up to You", free, monthly, pamphlet
 - 13) "What You Can Do About Water Pollution", U. S. Government Printing Office, Washington, D. C., 20402, pamphlet
 - 14) "Conservation Water Recreation", transparencies, Creative Visuals
 - 15) "Water Conservation", filmstrip, J. Weston Walch
- The above materials can be obtained from the Bourbon County Schools Materials Center (1-15).

EXERCISE #7

Title of Lesson: Animals and Their Young

Behavioral Objectives: After completion of this exercise, the students should be able to:

- 1) Describe how a mother animal cares for and protects its young
- 2) Contrast and compare this care and protection to their own family needs
- 3) Tell more about animals in their community
- 4) Practice conservation of wildlife
- 5) Encourage proper care of pets

Materials Needed:

- 1) Pictures of animals
- 2) Paper
- 3) Paints or chalk
- 4) Live animals
- 6) Cage
- 7) Jar for animals from the pond

Activities:

- 1) Study animals we should know
 - a) Kinds: wild
 - 1) squirrel
 - 2) deer
 - 3) gophers, etc.
 - Tame
 - 1) dog
 - 2) cat
 - 3) cow
 - 4) horse, etc.
 - b) Homes
 - 1) ground
 - 2) trees
 - 3) brush piles
 - 4) rocks, crevices
 - 5) man-made
 - c) Young
 - 1) protection and care
 - 2) drink milk from mother
 - 3) eyes closed at birth
 - 4) hair all over body
 - d) Food
 - 1) meat eaters
 - 2) plant eaters
- 2) Visit a museum.
- 3) Make a booklet of animal families.
- 4) Discuss the care of pets.
- 5) Let children tell stories about their pets.
- 6) Write safety rules about animals.
- 7) Invite a Game Warden or a Conservationist to speak to the children on animals and their young.
- 8) Learn some songs about animals.
- 9) Write a poem about your pet.

Follow-up Activities:

- 1) Review what we have learned about animals and their young.
- 2) Make chart listing names of animals and their young (example: bear: cub, cat: kitten, goat: kid).
- 3) Display booklets of animal families and their young.
- 4) Place a bowl of tadpoles, minnows, a turtle or frog in the science corner. Print the questions: Would this animal live in a desert terrarium?, Would it live in a cage?. Put a live rabbit in a cage. Print the question: Would this animal live in an aquarium?, Would it live in a cage?
- 5) Children can cut out pictures of animals and their young. They can be made into a frieze, add trees, grass, plants, shrubs and water with tempera paint or colored chalk. Place the cut out animals in their proper setting.

Evaluation:

- 1) Children will be able to understand the relationship between mother animals caring for their young and their own family care.
- 2) Children will have a better understanding of reproduction.

- 3) Children will understand how animals found in one location differ from those found in another.

Reference Materials:

- 1) Teacher's Curriculum Guide to Conservation Education, edited by Matthew J. Brennan, Director, Pinchot Institute (can be obtained from the Bourbon County Schools Materials Center)
- 2) Let's Find Out About Animal Homes, by Schapp, Charles and Martha
- 3) Elementary School Science and How to Teach It, Blough, Glen
- 4) "Pets to Make an Aquarium", filmstrip, Jam Handy, 2821 Grand Blvd., Detroit, Michigan
- 5) "Learning About Animals", filmstrip, Encyclopedia Britannica Films, Inc., 1150 Wilmette Ave., Wilmette, Illinois
- 6) "Animal Homes", filmstrip, McGraw-Hill Films, 330 W. 42nd St., New York, New York
- 7) Visit to the Children's Zoo, El Lilly Co., Public Relations Services, Dept., 307 East McCarty St., Indianapolis, Indiana (free)
- 8) How to Care for Your Dog, Ralston Purina Co., Purina Pet Care Center, Dr. J. E. Durbin, Director, 835 So. 8th St., St. Louis, Missouri (free)
- 9) Kittens and Cats, Puppies and Dogs, Small Animals, American Humane Association, Education Department, P. O. Box 1266, Denver, Colorado (free)

School Library Reference Materials:

- 1) Kittens and Cats, Animal Welfare Institute, P. O. Box 3492, Grand Central Station, New York, New York
- 2) Animal Babies, Harper, '59
- 3) Animals as Parents, Morrow, '65, 96p. illus., Selsam, Millicent E.
- 4) Wonders of Animal Nurseries, Dodd, '68, 63p. illus. by the author, Berrill, Jacquelyn
- 5) Zoo Babies, Morrow, '59, 94p. illus.
- 6) Junior Science Book of Pond Life, Garrard, '64, 64p. illus., Crosby, Alexander L.
- 7) Odd Pets, Crowell, '51, 166p. illus, Hogner, Dorothy Childs
- 8) All About Animals and Their Young, Random, '58, 148p. illus., McClung, Robert M.
- 9) When Animals are Babies, Holiday, '64, Schwartz, Elizabeth and Charles
- 10) Pondlife, Golden Nature Guide, Golden, '67, 160p. illus., Reid, George K.
- 11) Life in a Pond, Golden, '67, illus., Robinson, Carmelita K.
- 12) All Kinds of Babies, Four Winds, '69, illus., Selsam, Millicent E.

EXERCISE #8

Title of Lesson: Wildflower StudyPurpose:

To encourage the child to become more aware of the native wildflowers near their homes

Behavioral Objectives: After this exercise, the children should be able to:

- 1) Identify 5 wildflowers in their surroundings

- 2) Have a knowledge of the section of the country where they grow
- 3) Identify leaf shapes and flower shapes
- 4) Recall blooming season for these flowers
- 5) Be more aware of the conservation of wildflowers

Materials Needed:

- 1) Filmstrip, "Wildflowers Everyone Should Know"
- 2) Pictures of wildflowers
- 3) Books on wildflowers
- 4) Ferns
- 5) Terrarium
- 6) Construction paper for scrapbook
- 7) Shingles
- 8) Glue

Activities:

- 1) Plan a wildflower tour to the woods and along streams.
- 2) Have children notice the colors of the flowers, insects that are around the flowers and how the flowers smell.
- 3) Prepare a terrarium using moss, wildflowers, ferns and lichens.
- 4) Make a wildflower clock showing time of day and night different wildflowers bloom.
- 5) Create a bulletin board using some wildflower cutouts, pressed ferns and moss.
- 6) Make a scrapbook with dried wildflowers.
- 7) Write a short paragraph about a wildflower of your choice.
- 8) Play the games, "Be a Wildflower Explorer", and "Flower Wedding", Audubon Plant Study Program (can be obtained from the Bourbon County Schools Materials Center).
- 9) Dry some wildflowers, ferns, moss and grass. Arrange in a pleasing design on a rough shingle then glue in place.

Evaluation:

Have children:

- 1) Identify at least 5 wildflowers from pictures or real flowers.
- 2) Describe the location where some wildflowers grow.
- 3) Tell the blooming season for at least 3 flowers.
- 4) Practice conservation of wildflowers.

Reference Materials:

- 1) A Curriculum Guide for Nature Study in the Elementary School, developed by Mrs. Marilyn Greulich, McKinley Elementary School, Abington School District, Abington, Pennsylvania
- 2) Southeastern Pennsylvania Outdoor Education Center, Media, Pennsylvania
- 3) Wildflowers in Kentucky, Dr. Whacton and Barbour
- 4) Audubon Plant Study Program, National Audubon Society
- 5) Beginners Guide to Wildflowers, Ethel Hinchley Hauson
- 6) Wildflowers of Spring, G. Friesner and M. Hill

School Library Reference Materials:

- 1) First Book of Wildflowers, Watts, '61, 268p. illus., Cavanna, Betty
- 2) Macmillan Wildflower Book, Macmillan, '54, 480p. illus., Hylander, Clarence J.
- 3) Flowers: Guide to Familiar Wildflowers, Golden, '50, 157p. illus., Simitt, S. and Martin, Alexander C.

EXERCISE #9

Title of Lesson: Plants that Poison

Behavioral Objectives: At the conclusion of these activities, the students should be able to demonstrate their skills in:

- 1) Recognizing 3 kinds of harmful plants
- 2) Identify the toxic part of at least 3 plants
- 3) Describe orally the danger of poisons contained in them
- 4) Name 3 symptoms involved if one falls prey to these dangerous plants

Materials Needed:

- 1) Pictures of poisonous plants
- 2) Notebook and pencil for notes
- 3) Collection of poisonous plants for display in the classroom
- 4) Stories about children who have had a serious illness from poisonous plants
- 5) Chart of plants that poison

Activities:

- 1) Question that may be asked: a) Has anyone in your family ever been poisoned by plants (let children describe results)?, b) What are poisonous plants?, c) What makes some plants poisonous and some non-poisonous (inherited characteristics, protection, result of waste products)?, d) How do these poisonous plants affect people?, e) Why are some people allergic to poisonous plants?, f) Discuss types of plants that are poisonous when chewed.
- 2) Give reasons why you would not go into the woods and gather mushrooms to eat.
- 3) Which parts of a plant might be poisonous (leaves, thorns, stem, seed, flowers, fruit)?
- 4) Are animals poisoned from plants?
- 5) Are animals able to distinguish the difference between poisonous plants and non-poisonous plants?

Follow-up Activities:

- 1) Go on a trip around your school yard and find as many poisonous plants as you can.
- 2) Make a large chart listing plants that are poisonous and include the toxic part of the plant and the symptoms.
- 3) Put plants into different categories: house plants, flower and garden plants, vegetable garden plants, ornamental plants, trees and shrubs, plants in swamp or moist areas, plants in wooded areas, plants in fields.

Example: House Plants

<u>Plant</u>	<u>Toxic Part</u>	<u>Symptoms</u>
Daffodil	Bulbs	Nausea, vomiting, diarrhea, may be fatal

- 4) What characteristics do these plants have that make them easy to recognize? Identify poison oak and ivy leaves (remember: if leaves are three, let them be).
- 5) Should we eat berries and fruit we find in fields and woods?
- 6) Find ways to tell if plants are poisonous: a) send plants to the state herbarium for determining the amount of poison, b) dry or fresh plants can be mailed in a plastic bag.
- 7) A good project: go out and burn or spray poisonous plants around the school ground (keep proper distance from the plants so as not to inhale the fumes from the spray or burned plants and stand opposite the way the wind blows).
- 8) Write a short story about a child lost in the woods who came in contact with poisonous plants.

Evaluation:

- 1) The child can recognize plants and berries that are beautiful to look at but are poisonous.
- 2) The child can recall the toxic parts of some plants and the result of being in contact with them.
- 3) The child will describe some of the symptoms relating to poisonous plants.

Reference Materials:

- 1) People and Their Environment. Teacher's Guide to Conservation Education, edited by Matthew J. Brennan, Director, Pinchot Institute
- 2) Poisonous Plants of the United States and Canada, by John M. Kingsbury
- 3) "Common Poisonous Plants", leaflet, U. S. Department of Agriculture, Soil Conservation Service, Washington, D. C.
- 4) Free materials from the National Safety Council, School and College Department, 425 N. Michigan Ave., Chicago, Illinois
- 5) "Plants that Poison", poster, Geigy Agricultural Chemicals, Division of CIBA, Saw Mill Road, Ardsley, New York

EXERCISE #10

Title of Lesson: Weather Folklore

Behavioral Objectives: After completion of this exercise, children should be able to:

- 1) Develop an appreciation for and become familiar with folklore
- 2) List 3-5 ways the pioneers predicted the weather
- 3) Make predictions about the weather by using folklore when weather situations arise

Materials Needed:

- 1) Books on folklore: Weather Folklore, Sandersons
- 2) Construction paper
- 3) Cotton
- 4) Paints
- 5) Crayons

Activities:

- 1) Let children ask parents and grandparents to recall old weather folklore sayings they have heard.
- 2) Try to find out how many are accurate.
- 3) Read as many books on folklore as you can find available.
- 4) Keep records of conditions that suggests weather folklore.
- 5) Obtain an almanac to create interest in folklore.
- 6) Compare weather forecasts today with that of long ago.
- 7) Draw pictures to illustrate the folklore stories and make a bulletin board display.
- 8) Read to find more about the natural explanations for weather folklore as told in each story.
- 9) Compile a list of old weather folklore sayings such as the following:
 - a) A heavy harvest of nuts predicts a bad winter.
 - b) When sheep are in a huddle, there will be mud in the puddle.
 - c) When the Indians could hang a powder horn on the moon, it was a sign of rain before noon.
 - d) A heavy coat of fur on animals denotes a severe winter.
 - e) A cricket call denotes signs of fall.
 - f) Ants in a straight line is a sign of rain; when ants scatter, expect fair weather.
 - g) Raincrow's call in the evening means it will rain that night.
 - h) Rain before seven, clear before eleven.
 - i) If March comes in like a lion, it will go out like a lamb.
 - j) When a turtle bites, it will not let loose until it thunders.
 - k) Evening red and morning gray sends a traveler on his way; evening gray and morning red, puts a cover over his head.
 - l) Thunder in February, it will hail in May.
 - m) Sunshine and shower, it won't last a half hour.
 - n) Rooster's crow before midnight, you will have falling weather within 24 hours.
 - o) When one sees lightning, count the seconds until he hears the thunder; the number of seconds indicate how many miles away the lightning struck.

Evaluation:

- 1) The child can show appreciation by the material he has brought in.
- 2) The children can list ways pioneers predicted the weather.
- 3) Several times the children predicted the weather by a folklore.

Reference Materials:

Sandersons Weather Folklore

School Library Reference Materials:

- 1) Storms, Their Origins and Effects: Forecasting and Weather Lore, Golden, '66, 58p. illus., Lehr, Paul E.
- 2) Lightning, Rand McNally, '61, 61p. illus., Bendick, Jeanne
- 3) Wind, Rand McNally, '64, 80p. illus., Bendick, Jeanne

EXERCISE #11

Title of Lesson: Enjoy a School Nature Garden

Behavioral Objectives: At the conclusion of this exercise, the children should be able to:

- 1) Keep surroundings around the home beautiful
- 2) Keep children more aware of the beauty of nature and natural processes
- 3) Develop powers of observation

Materials Needed:

- 1) Area suitable for a nature plot
- 2) Bird feeders
- 3) Bird bath
- 4) Weather station
- 5) Weather instruments
- 6) Sun dial
- 7) Wildflowers
- 8) Ferns
- 9) Logs
- 10) Stumps
- 11) Moss
- 12) Rocks
- 13) Rock garden
- 14) Miniature fish pond
- 15) Water lillies
- 16) Rustic seats (made by children)
- 17) Trees to plant
- 18) Shrubs to plant

Activities:

- 1) Children and teacher will select a suitable area near the school to improve its conditions and to be used as a site for the nature area.
- 2) Clear off debris.
- 3) Draw a sketch of the proposed plans for the nature area.
- 4) Make some bird feeders to encourage birds to become permanent residents: a) bird feeders can be made from mesh onion bags filled with suet, b) plastic gallon jugs and pie pans, c) pine cones using suet and peanut butter, d) feeders made of wood, e) hang popcorn on trees for birds.
- 5) Make a bird bath --- a simple one can be made from a garbage can lid and gravel. Keep filled with clean water.
- 6) Build a weather station.

- 7) Make some weather instruments: a) make a weather vane to put on a tall post, b) build a sun dial.
- 8) Find places where wildflowers are plentiful. Transplant some in nature area: plant some ferns and mosses near this setting.
- 9) Search for old logs and stumps in which animals should make their homes. Place some of these near the wooded area.
- 10) Take the children on a trip to a stream and find interesting rocks large and small for a rock garden. Be sure to get different kinds and shapes. The larger ones should be used around the edges of the rock garden.
- 11) Near the rock garden, build a small fish pond. Children can bring some goldfish from their homes or minnows they catch from a stream near their home.
- 12) Plant a few water lillies for color near the pond.
- 13) Use larger rocks and logs to build seats for children to use and enjoy the nature area.
- 14) Plant some trees and shrubs that bloom in wooded areas.

Follow-up Activities:

- 1) Class can study the temperature changes in the shaded area and sunny areas.
- 2) Keep a record of the time of day the temperature was the highest and lowest.
- 3) Why is the temperature cooler in the shady spots (trees, shrubs overhead)?
- 4) Count the chirps of a cricket. Count the number of chirps in 15 seconds and add 38. The answer will be the approximate Fahrenheit temperature.
- 5) Observe bird nests, their location and nesting materials.
- 6) Watch for animals that are visiting the area: list clues they found such as tracks, nests, dens, feathers, fur, cocoons, hair.
- 7) Make bird silhouettes.
- 8) Make nature prints from dried materials.
- 9) Play a game "Nature Alphabet". Children print letters of alphabet. Go to nature area and find things of nature beginning with letters of the alphabet.
- 10) Play games matching tracks with animals on flash cards.

Evaluation:

- 1) The child kept the surroundings around his home beautiful.
- 2) The child was aware of the beauty found in nature.
- 3) The child developed powers of observation.

Reference Materials:

- 1) People and Their Environment, Teacher's Curriculum Guide to Conservation Education, edited by Matthew J. Brennan, Director, Pinchot Institute
- 2) A Curriculum Guide for Nature Study in the Elementary School, developed by Mrs. Marilyn Greulich, McKinley Elementary School, Abington School District, Abington, Pennsylvania
- 3) Environmental Education: Objectives and Field Activities, by James M. Major and Charles A. Cissell and the Paducah Public Schools Environmental Education Staff, Paducah, Kentucky

School Library Reference Materials:

- 1) Let's Collect Shells and Rocks, Shell Oil Co. (free)
- 2) First Book of Stones, Watts, '50, 93p. illus., Cormack, M. B.
- 3) How and Why Wonder Book of Mushrooms, Ferns and Mosses, Grosset, '65, 48p. illus., Jensen, Amy Elizabeth
- 4) Field Book of Common Rocks and Minerals, Putnam, '48, 352p. illus., Loomis, Frederic B.
- 5) A Guide to Trees and Shrubs, Houghton, 431p. illus., Petrides, George A. and Peterson, R. T.
- 6) Field Guide to Rocks and Minerals, 3rd ed., Houghton, '60, 349p. illus., Pough, F.
- 7) Doubleday First Guide to Rocks, Doubleday, '63, 30p. illus., Shuttlesworth, Dorothy
- 8) Story of Rocks, Garden City, '56, 56p. illus., Shuttlesworth, Dorothy
- 9) Story of Mosses, Ferns and Mushrooms, Doubleday, '55, 159p. illus., Sterling, Dorothy
- 10) Rocks and Minerals, Golden, '57, 160p. illus., Zim, Heberts

SPECIAL EDUCATION EXERCISE PLANS
Incorporating Environmental Studies

Sources Consulted in Developing:

Teacher's Curriculum Guide to Conservation Education

Matthew J. Brennan
J. G. Ferguson Publishing Company
Chicago, Illinois

Agriculture Resources Unit (Module): Community Pollution

Developed by Wilson G. Collins
University of Kentucky
Lexington, Kentucky

Compiled by:

Miss Sue Gilvin
Special Education Teacher
Clintonville Elementary School
Bourbon County Schools
Paris, Kentucky 40361

Title of Lesson: Social Behavior: Anti-Littering Campaign

Behavioral Objectives: Completion of this exercise will enable the child to:

- 1) Develop an awareness of what littering is and it's connection with environmental pollution
- 2) Grow in ability to accept responsibility for the environment
- 3) Control litter through personal action
- 4) Develop daily habits that will keep our world an attractive place to live in
- 5) Realize that litter is a problem which people can prevent

Materials Needed:

- 1) Oil cloth
- 2) Heavy paper
- 3) Tempera paint
- 4) Magic markers
- 5) Yarn
- 6) White contact paper
- 7) Camera and color film
- 8) 55 gallon oil barrel
- 9) Paint
- 10) Paste or glue
- 11) Poster paper
- 12) Chart paper
- 13) Garbage bags
- 14) Paint brushes
- 15) Scissors
- 16) Coffee cans for paint

Activities:

- 1) Prepare before class a mask from a big paper bag. Dramatize being a litterbug by wearing the mask and throwing trash over the room. Ask questions: a) What am I?, b) What does a litterbug do?, c) Are you a litterbug?, d) Have you ever seen a litterbug?
- 2) Take the class for a walk around the school, community, etc. This is a "look-study" period. Enforce silence and reserve comments for the return to the room.
- 3) Discuss the hazards posed by the problem of littering. Examples: fire and health.
- 4) Make a chart as the children name different things that represent litter (paper, banana peels, candy wrappers, sticks, toys, cans, bottles, etc.).
- 5) Write a story about a paper napkin that went to a picnic.
- 6) Make a chart of the "do's and don'ts" for keeping a clean school, home and community.
- 7) Have a clean-up time for the classroom, school and school grounds.
 - a) See how much litter can be found in one area of the playground.,
 - b) Have a contest, boys versus girls, to see which team can collect the largest pile of litter.,
 - c) Count the number of trash receptacles the students find. Are they well marked and easily located for use? If not, let the students paint and mark them.,
 - d) Take before and after pictures for a scrapbook, or to publish in the local paper.

Follow-up Activities:

- 1) Use teacher and student made bulletin boards in the classroom and available areas throughout the school.
- 2) Have the students make and display posters throughout the community.
- 3) Clean and paint a large oil barrel for the school and/or community.
- 4) Make litterbags for cars, bicycles and school desks. Directions for making litterbags: litterbags can be made from fabric, plastic, oil cloth or heavy paper. For each bag, cut 2 pieces: 1 6"x8" (front) and 1 6"x10" (back). Curve the top of the back piece and cut a slit for hanging it over a knob. Seam the 2 pieces together with yarn.
- 5) Make bumper stickers and badges out of white contact paper and magic markers.
- 6) Have the children plan a skit and develop a school-wide anti-litter campaign: a) Have students visit each class and present their skit and anti-litter campaign., b) Students in the school who wish to do so will sign an anti-litter pledge to "Reconsider Before You Litter". (We the students of _____ School of _____, pledge "I will not.....")., c) Distribute the anti-litter badges to students who participate in the above activity.
- 7) Play the "Litterbug Game". Directions for the game: the children form a circle and choose 2 people to play the parts of a litterbug and a neaterbug. Sing the jingle to the tune of "Did You Ever See a Lassie":
"Oh here comes a litterbug, a litterbug, a litterbug,
Oh here comes a litterbug
Just see what he'll do.

I don't want to be a litterbug, a litterbug, a litterbug
I don't want to be a litterbug
And neither do you.

Oh I want to be a neaterbug, a neaterbug, a neaterbug
Oh I want to be a neaterbug
And so do you."

- 8) Make a symbolic "litter monster" out of the litter that the children collect in the school yard. He will serve as a reminder of the anti-litter campaign and encourage others to join in the project.

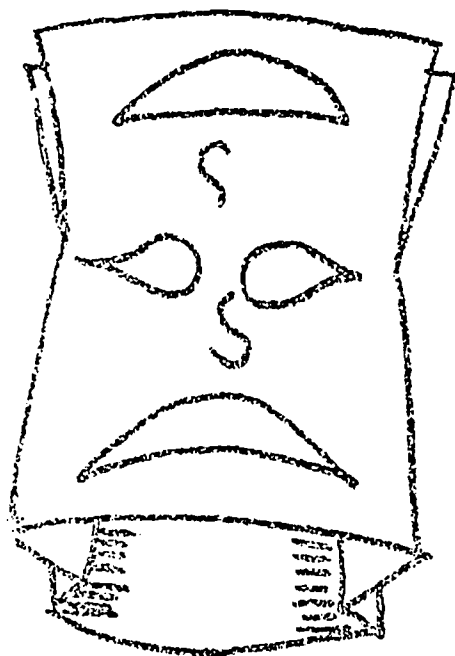
Evaluation:

- 1) The child knows what litter is and helps control littering through his personal actions.
- 2) The child exhibits changes in his habits and attitudes in realizing his responsibilities toward his environment.
- 3) The child can define litter and types of litter.
- 4) The child knows do's and don'ts important in helping solve the problem of litter pollution.
- 5) The child encourages other people to help prevent litter.

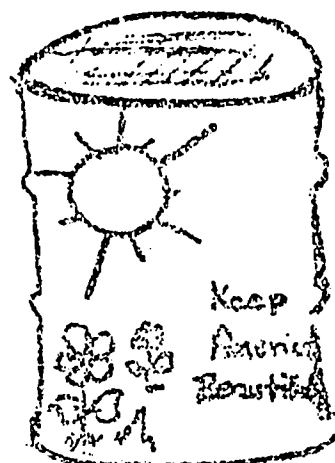
Reference Materials:

- 1) "Lassie's Litter Bit", film, color, 28 min., available at the Bourbon County Schools Materials Center
- 2) "Litterbug", film, color, 8 min., Walt Disney, available at the Audio Visual Services, University of Kentucky, Lexington, Kentucky
- 3) "Telling the Anti-litter Story in Home, School and Community through

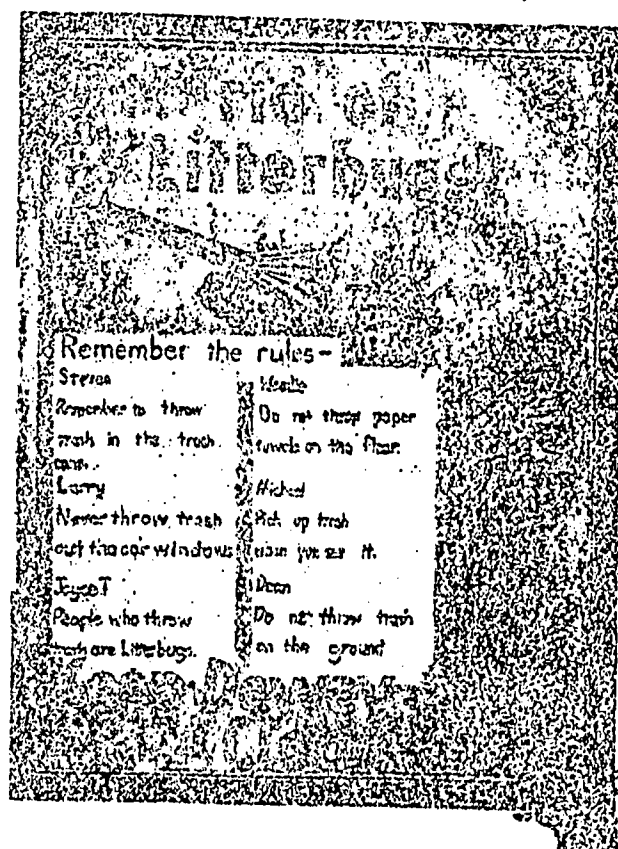
- the Use of Classroom Bulletin Boards", free materials, Standard Oil Company of California, Public Relations Department, 225 Bush Street, San Francisco, California, 94120
- 4) "KAB Reports", pamphlet, Keep America Beautiful, Inc., 99 Park Avenue, New York, New York, 10016, Summer, 1970
 - 5) "Ebid", Summer, 1969, pamphlet
 - 6) "Dan'l Boone Swept Here", pamphlet, Kentucky Clean-up and Beautification Program, Kentucky State Department of Natural Resources



Litterbag Mask

Trash Barrel
(55 gallon oil can)

Instructor, November, 1970

Litterbag
(fabric, plastic,
oil cloth)

Bulletin Board

Is this the way?

Words and music by Marian Hunter

1. Is this the way you want A - mer - i - ca? Is

this the way you want your land? Filth-y streams, junk - y lakes, What a

mess your lit - ter - ing makes! Is this the way you want your land?

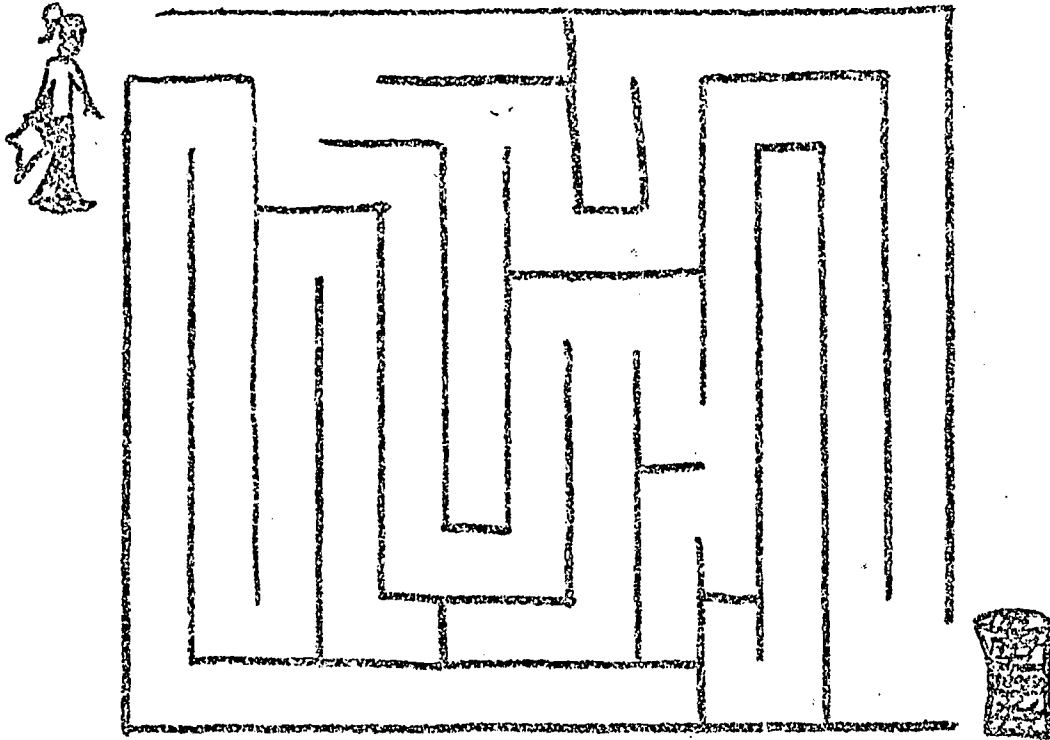
2. Is this the way you want Colorado?
 Is this the way you want your state?
 Littered roadides, trash-filled parks,
 Disrespect for old landmarks,
 Is this the way you want your state?
3. Is this the way you want Otero County?
 Is this the way you want your land?
 Ugly eyesores everywhere,
 Bottles and cans, or don't you care?
 Is this the way you want your land?
4. Is this the way you want La Bata?
 Is this the way you want your town?
 Crumbling buildings, trashy slums,
 Paint a picture mighty gleam,
 Is this the way you want your town?

(cont.)

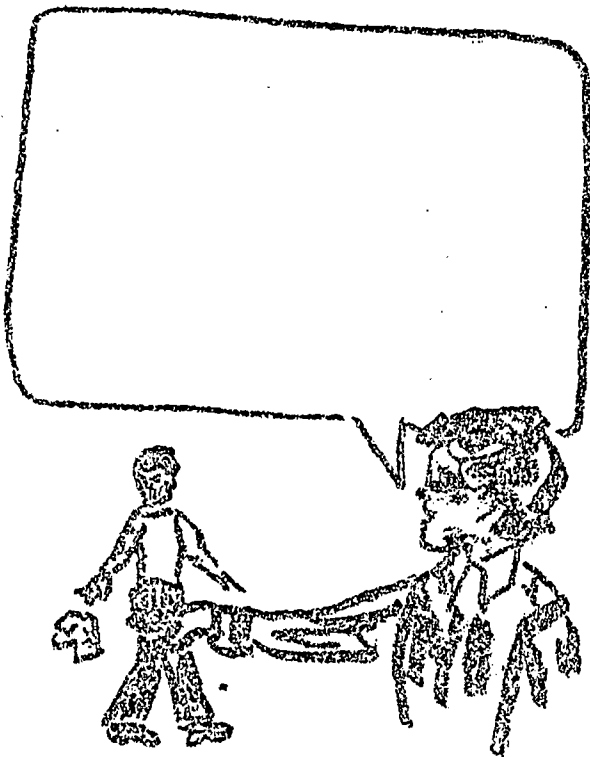
Change the state, county, and town to your own.

Draw a line to help Mary Lou find the trash basket.

122



Game



What is John saying?

Title of Lesson: Appreciation of Our Environment Through Our Senses

Purpose: To develop the child's skills in thinking, seeing and doing so that the child will become more sensitive to his environment by:

- 1) Observing the total environment through his senses
- 2) Becoming aware of the beauty, serenity and mystery involved throughout our different environments
- 3) Observing through the major senses what is pleasant and what is unpleasant in nature
- 4) Learning to protect the beauties which they are able to hear, smell, see and feel

PART I: To SeeBehavioral Objectives:

- 1) Students will recognize the many different colors, shapes, shades and sizes in nature
- 2) Each student will observe things in nature at distances (near, far and close)
- 3) Each student will observe things in nature at different heights (eye level, up, down, tiptoe, lying on the ground, etc.)
- 4) Students will discover things that nature has hidden
- 5) Students will determine what things are pleasant to see and what things are unpleasant to see
- 6) Students will learn that each person may see different things and may see things differently

Materials Needed:

- 1) Chart paper
- 2) Tempera
- 3) Paper
- 4) Slide and film projector
- 5) Construction paper

Activities:

- 1) Have the class go to a designated area and have a silent "look and see" time. After observations are made do the following: a) Have each student tell about something that he saw and had never noticed before., b) Some students may want to point out things that they see and others do not.
- 2) Have the students observe at different heights and ask questions such as: a) What do you see when you are standing? How far can you see? Is everything still? What colors can you see? etc., b) What do you see when you look up very high? Are there clouds? What shapes are the clouds? Do you see leaves falling? Ashes? Are you looking through branches? etc., c) What do you see when you look toward the ground? Footprints? Litter? Pebbles? Grass? Soil? Insects? etc., d) Lie down on the ground. How far can you see? What colors do you see? What do you see just in front of you? etc.
- 3) Have the students observe objects from different distances.

- 4) In the classroom, make reading charts of things that the students observed and of new concepts developed: a) things that are pleasant and things that are unpleasant to see, b) list of colors, shapes, animals, etc. observed by the children, c) list of man-made natural objects observed.
- 5) Discuss experiences that take place outdoors that cannot be enjoyed anywhere else.
- 6) Discuss the beauty of nature and different ways that this beauty can be expressed: a) poetry, b) painting, c) music, d) books, e) photography (slides, movies, etc.).

Follow-up Activities:

- 1) Take the students outside for an art lesson. Have them paint landscapes using natural colors. This may be a good time to introduce the primary colors.
- 2) Use activities, games, lessons to help the students in developing 3-dimensional visual discrimination skills.
- 3) Play games with the children such as "On the Way to School I Saw".
- 4) Discuss what the community might have looked like before it was inhabited by man.
- 5) Discuss ways that the students can help keep the environment beautiful and how they can help make their immediate surroundings more attractive.
- 6) Show slides and films to the students.
- 7) Make a scrapbook and/or bulletin board of pleasant and unpleasant things to see in our environment.
- 8) Have the students bring in pictures of their favorite scenes for display on the bulletin board.

Evaluation:

- 1) Observation of student's participation.
- 2) The student is able to recognize different colors, shapes, shades and sizes from nature.
- 3) The student is aware of how things look at different distances with relationship to size.
- 4) The student can express his feelings toward pleasant and unpleasant sights to see in nature.

PART II: To Feel

Behavioral Objectives:

- 1) Each student will feel the different kinds of textures in the environment (tree, bark, stone, pebbles)
- 2) Students will learn to distinguish different kinds of texture (smooth, rough, glazed, sticky, etc.)
- 3) Students will feel sharp and dull objects (thorns, stumps, twigs, pebbles, etc.)
- 4) Students will compare different shapes and textures in nature
- 5) Students will learn what some things in nature are alive and some things that are dead
- 6) Students will notice the changes in the air when it is still, hot, cold, wet, sticky, etc.

Materials Needed:

- 1) Texture samples
- 2) Mud
- 3) Soil
- 4) Clay
- 5) Gravel
- 6) Wooden block box
- 7) Mounting texture samples
- 8) Glue
- 9) Pebbles
- 10) Pine cones
- 11) Seashells
- 12) Bark
- 13) Tempera
- 14) Spray plastic coat
- 15) 20 small stones for each student
- 16) Cardboard or cork squares

Activities:

- 1) Introduce the children to different texture in the classroom:
a) Blindfold the children and have them identify different textures (rough, smooth, hard, soft)., b) Mount different textures on wooden squares and place them in a box. Let the children reach in the box and tell what texture they have chosen.
- 2) Take the children outside to identify the different texture in their environment. Let the children collect small bits of different textures that they can find (bark, pebbles, weeds, grass, acorns, nuts, etc.).
- 3) Bring in soil, mud, sand, clay and gravel: a) Let the children experience the feel of the different samples., b) Add water to the different samples and see what happens (why does the mud stick together? why doesn't the sand stick together?).
- 4) Make a vocabulary list of new words that have been introduced in the unit (sharp, dull, rough, smooth, texture, etc.).
- 5) Make a nature collage of the collection that the children made on their outdoor visit.

Follow-up Activities:

- 1) Mosaics can be made out of pebbles, seashells, bark, pinecones, etc.
- 2) Have the children make clay bowls and models.
- 3) The children can make a paperweight out of stones. Directions: find 15 or 20 small stones. Glue one of the larger stones to the center of a piece of cork or cardboard (about as big as your hand). Glue the other stones in a circle around the center stone. More than one circle may be made. Paint each stone. When the paint dries, shellac each stone. Cut away the stone or cork that sticks out beyond the base.

Evaluation:

- 1) The student can detect and describe different textures found in nature.
- 2) The students can determine what things in nature are alive and what things are dead.
- 3) The students can distinguish between sharp and dull objects.

PART III: To HearBehavioral Objectives:

- 1) Each student will learn to listen to loud and soft sounds in nature
- 2) Each student will listen to pleasant and unpleasant sounds in nature
- 3) Students will identify different sounds in nature
- 4) Students will identify the difference between natural and mechanical (man-made) sounds.
- 5) Students will be able to identify distant and close up sounds and sounds at different heights and levels
- 6) Students will listen to and identify such different sounds as calling, warning, hungry, happy and talking. Sounds while sitting, standing, kneeling, etc. on a hill, in a cave, behind a tree and under a blanket
- 7) Students will compare inside sounds with outside sounds.
- 8) Each student will identify some sounds with what makes them: tree, wind, rain, bird, insect, animal, machine, etc.

Materials Needed:

- 1) Record player
- 2) Tape recorder and tapes
- 3) Coffee cans
- 4) Old intertubes
- 5) Wooden blocks
- 6) Sand paper
- 7) Used light bulbs
- 8) Newspaper
- 9) Wheat paste
- 10) Lid (oat box)
- 11) Bottle caps
- 12) Melodic bells

Activities:

- 1) Have the students close their eyes and listen for sounds. Make a list of sounds that they hear on the chalkboard: a) Make different sounds while the students close their eyes and ask them to identify the sounds., b) Use different objects to make sounds., c) Make tape recordings of different sounds for the students to identify.
- 2) Take the class outside for a listening period. Remember to enforce silence for this experience: a) Distinguish between the sounds of nature and man-made sounds., b) Distinguish between pleasant and unpleasant sounds., c) Let the students mimic different sounds., d) Let the students make sounds from different distances, heights, and places. Record the sounds and play back so that the students may know the difference.
- 3) Make tape recordings of different sounds. Have the students make a chart of the sounds as they listen to them.

What made the sound?	Where would you hear this sound?	Was it loud or soft?

- 4) Play records that will help the students in listening activities and with the identification of different sounds:
 - a) Ear Training for Middle Grades
 - b) Songbirds of America in Color, Sound and Story
 - c) The Bird World of Song
 - d) Noisy and Quiet: Big and Little
 - e) Listen: There are Sounds Around You
- 5) Discuss noise pollution (too much noise): a) What noises bother people?, b) What noises bother animals?, c) Can too much noise be harmful?
- 7) Discuss the different kinds of sounds: a) sounds that are pleasant to hear, b) sounds that help people, c) sounds that are too noisy. Make recordings of the sounds discussed. Have the students identify and chart the sounds in the following manner:

What made the Sound?	Man-made or Natural?	Pleasant or Unpleasant?	Does it Help People? How?	Was it too Noisy?

- 8) Let the children bring in a list of sources of sounds they find at home.

Follow-up Activities:

- 1) Play nature recordings and have the students draw pictures of what he hears.
- 2) Let the children use their bodies to express their feelings as they listen to "Thunderstorm" from the Grand Canyon Suite and "On the Trail" from the same record.
- 3) Let the students make different musical instruments and experiment with sound. Musical instruments such as the following may be made:
 - a) drums: use a coffee can and an old intertube, b) sticks: find straight sticks, peel, sand and polish them, c) maracas: use an old light bulb and cover with paper mache; paint and decorate and preserve with a coat of clear, plastic spray, d) sand blocks: glue pieces of sand paper on 2 wooden blocks; tack leather straps on the blocks, e) tambourine: use a lid from Quaker Oats box and soft drink bottle caps.
- 4) Teach the students to play melodic bells.
- 5) Use poetry that contains interesting "sound" words (example may be found in Childcraft, Vol. I, pp. 116, 117, 100, 99, 95 and 98).

Evaluation:

- 1) The student can discriminate between different sounds in nature.
- 2) The students can determine what sounds are pleasant and what sounds are unpleasant.
- 3) The students will distinguish between natural and man-made objects.
- 4) The students will identify different sounds.

PART IV: To Smell

Behavioral Objectives:

- 1) Each student will learn to identify different smells in nature.

(sweet, sour, fresh, musky)

- 2) Each student will identify pleasant and unpleasant odors in nature
- 3) Each student will become aware of potential dangers in using their sense of smell (paints, smoke, pollen, dust, insects)
- 4) Each student will smell different soils and water
- 5) Each student will identify different things that make odors in nature (plants, soil, fish, water, birds, animals, etc.)

Materials Needed:

- 1) Containers (cottage cheese cartons, plastic bags)
- 2) Chart paper
- 3) Odor samples (spray paint, glue, ammonia, gasoline, etc.)
- 4) Drawing paper
- 5) Crayons
- 6) Containers to burn sample in
- 7) Bits of wood, rubber, plaster, feathers, etc. to burn

Activities:

- 1) Introduce the unit by spraying a pleasant and then an unpleasant odor about the classroom: a) Make a chart of pleasant and unpleasant odors that the students can think of immediately., b) Leave space on the chart for new odors that they discover during the study.
- 2) Furnish the students with containers (plastic bags, cottage cheese cartons, etc.) so that they may collect different samples of odors from their environment for the science table (flowers, hay, pond water, wet leaves, fresh cut wood, rotting apples, onions, mud, etc.): a) have the students label their collection., b) Have the students classify the odors (pleasant and unpleasant). Some students may enjoy odors that others do not., c) Blindfold the students and let them identify the different odors of the collection.
- 3) Bring samples of odors that are dangerous to class and let the students become familiar with them (plant vapors, smoke, glue, gasoline, sewage, etc.).
- 4) Let the students add the new odors that they have learned to the chart that they began in first activity.
- 5) Talk about different odors in different seasons and reinforce this as the seasons approach.
- 6) Discuss pleasant and unpleasant body odors and ways to maintain a pleasant body odor (display soap, deoderant, powders, toothpaste, etc.).

Follow-up Activities:

- 1) Draw the noses of different animals (rabbit, deer, snake, fish, bird, snake, insect, etc.).
- 2) Draw pictures of things that have pleasant and unpleasant odors (flower, skunk, foods, etc.).
- 3) Burn different samples so that students may experience and identify different odors that may represent danger (wood, rubber, plastic, feathers, sulfur).
- 4) Read poems about the sense of smell (Childcraft, Vol. I, p. 150).

Evaluation:

- 1) The student can identify different odors in nature
- 2) The student can identify pleasant and unpleasant odors in nature.
- 3) The student can identify certain odors with potential dangers.

- 4) The student can identify different sources of odors in nature.

PART V: To Taste

Behavioral Objectives:

- 1) Each student will know that there are rules to abide by in "picking" nature's edibles (dangers)
- 2) Each student will taste sweet and sour tastes in nature
- 3) Each student will taste pleasant and unpleasant items in nature
- 4) Each student will taste different leaves, roots, stems, shoots and bark in nature
- 5) Each student will recognize some edible plants
- 6) Each student will develop an awareness of the relationship between smell and taste
- 7) Each student will taste vegetables from different sources and observe the differences in taste (fresh, hothouse, canned, frozen)
- 8) Each student will be aware that many vegetables, fruits, water and animal life are polluted by man

Materials Needed:

- 1) Vegetables
- 2) Fruits
- 3) Cooking utensils
- 4) Hot plates
- 5) Chart paper
- 6) Wild meats
- 7) Newspaper
- 8) Wheat paste
- 9) Tempera
- 10) Brushes
- 11) Spices
- 12) Magazines

Activities:

- 1) Bring in bark, leaves, roots, stems, etc. from nature that the students may taste.
- 2) Collect and cook dishes from nature, gardens, etc.: a) root: carrot, beet, potato, parsnip, turnip, b) stem: rhubarb, asparagus, hickory shoots, milk weed shoots, c) leaf: onion (underground), lettuce, spinach, brussel sprouts, cabbage, kale, dandelion, watercress, mustard, parsley, d) flower: broccoli, cauliflower, e) seed: bean, pea, corn, okra, f) fruit: tomato, apple, pumpkins, egg plant, melons, berries, grapes, papaw, persimmon, g) sap: maple, boxelder, walnut, hickories, birches, h) birds: partridge, pheasant, quail, i) tea: sumac, coffeetree, sassafras, basswood, j) spices: cinnamon, clove, nutmeg, k) herbs: chives, parsley, eill, l) sweet: berries, melons, m) sour: berries, lemons, grapefruit, n) salt: ocean, grass, o) have the students make individual charts of their likes and dislikes, p) make sure that all students taste things that they have not tasted before, q) have the students hold their noses and taste different foods (an onion and an apple), r) blindfold the children and see if they can identify a cola, 7-up and gingerale.

- 3) Identify plants (fruits, etc.) that are poisonous if eaten. Make a bulletin board using pictures of such plants.
- 4) Prepare different animals for the students to taste (rabbit, fish, dove, squirrel, duck, etc.).

Follow-up Activities:

- 1) Make paper mache models of mushroom, vegetables, berries, etc.
- 2) Let the students write invitations and invite different school personnel to their tasting party.
- 3) Find out the different uses of plants such as flavorings, medicines, dyes, etc.)
- 4) Make a window garden in the classroom.
- 5) Make an African market stall by placing 4 sticks or branches in buckets filled with sand or rocks. Add a straw-covered roof. Place real fruits and vegetables on a low table for the children to sample.
- 6) List different types of foods and discover how many ways they can be served.
- 7) Discuss the different things that different animals and insects eat.
- 8) Make a food tree to display the paper mache projects.

Evaluation:

- 1) The student can distinguish nature edibles that are safe to eat and those that are dangerous.
- 2) The students will sample foods from nature that they have never had.
- 3) The students will distinguish between sweet and sour types.
- 4) The students will understand that there is a relationship between taste and smell.

PART VI: Review of the Five Senses

Behavioral Objectives:

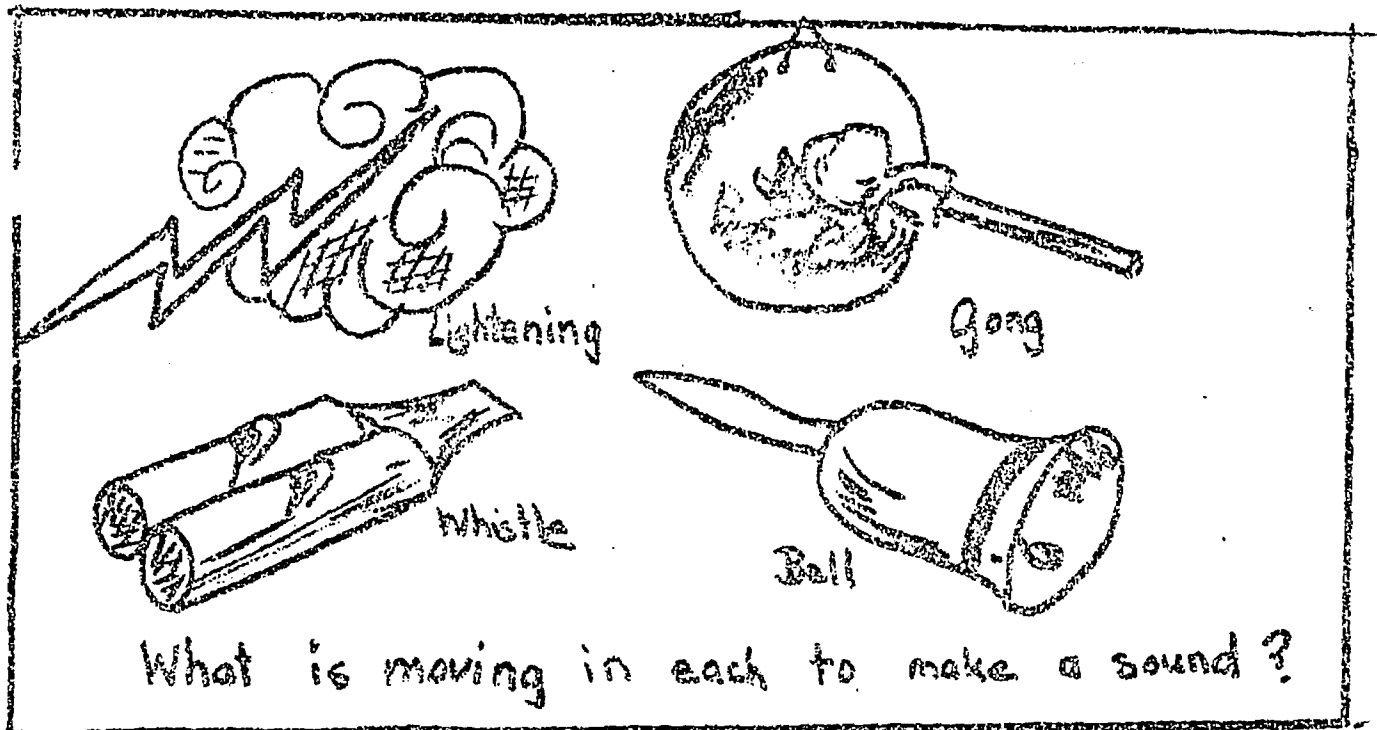
- 1) Each student will carry out the objectives of the previous 5 parts
- 2) Reinforcement will be made where weaknesses in understanding are observed
- 3) Each student will use the 5 senses in describing things in nature
- 4) Each student will recognize the importance of their 5 senses in reference to their responsibility in helping the environment survive
- 5) Each student will note how wildlife depends on their 5 senses
- 6) Each student will recognize the importance of their 5 senses in relationship to appreciation of the environment
- 7) Each student will become more sensitive to his environment through the use of the 5 senses

Materials Needed:

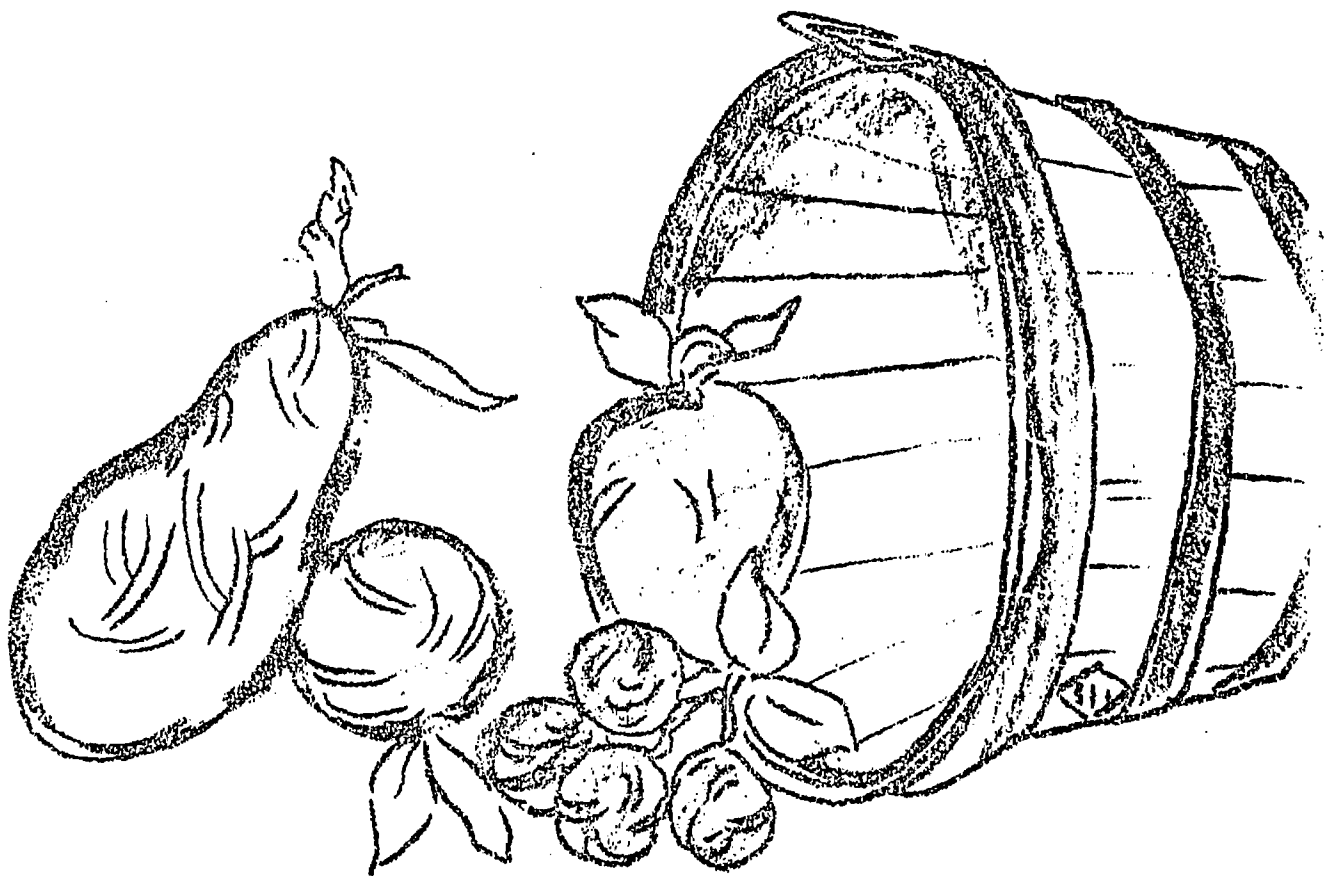
Materials used through the first 5 parts of the study

Activities:

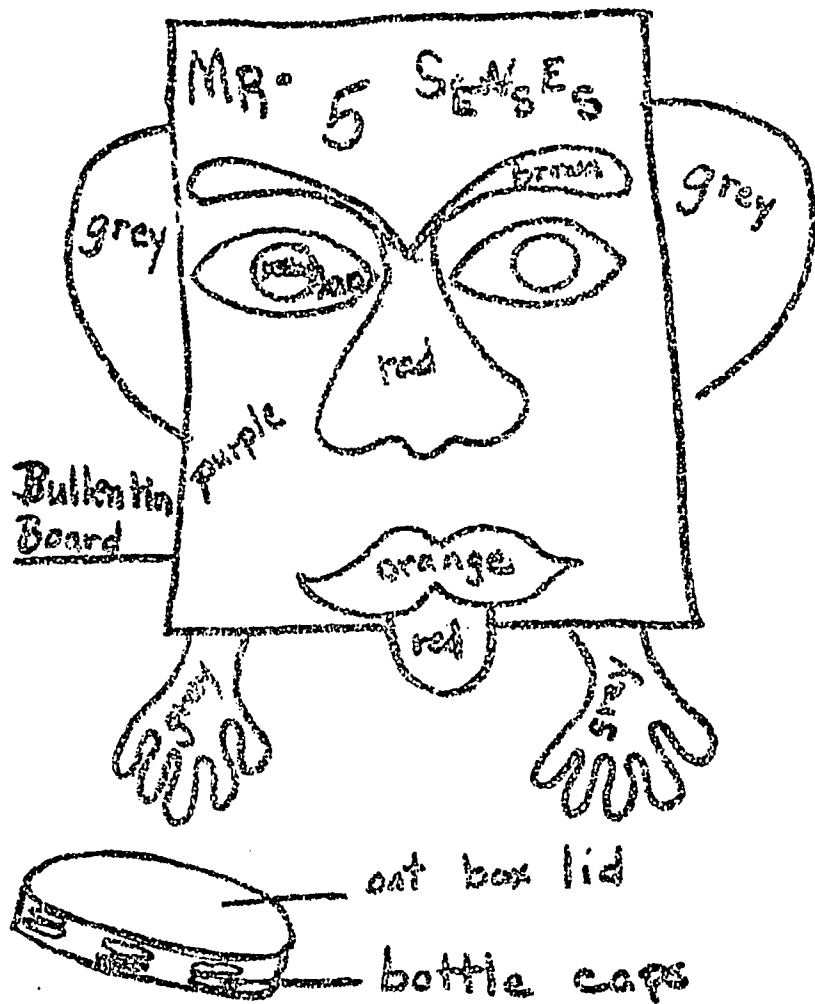
- 1) Have the students make a scrapbook with information they have learned throughout the unit (copies of charts, new words, concepts, pictures collected, etc.).



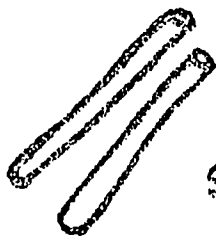
Bulletin
Board



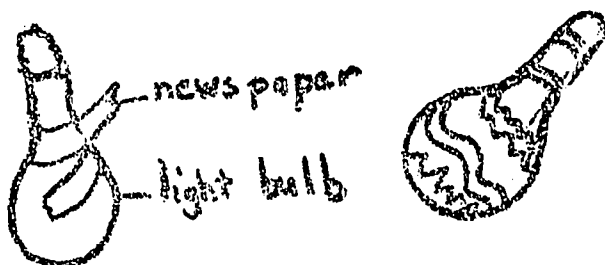
Fruits and Vegetables
(balloons covered with yarn
dipped in plaster)



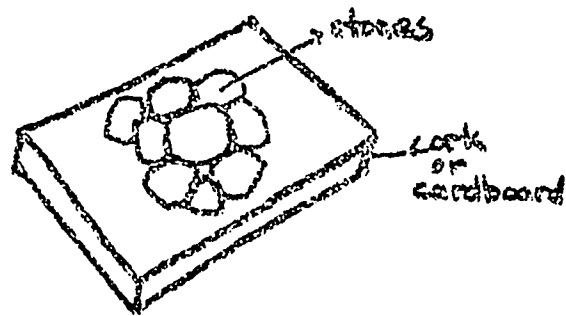
Tamborine



Sticks

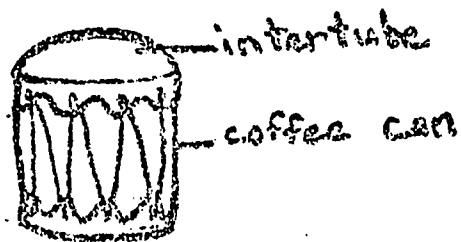


Maracas
(break the light bulb
for sound)

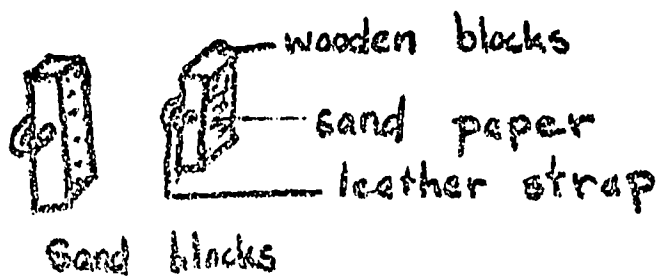


Paper weight

Musical Instrument



Drum



Sand blocks

EXERCISE #2 (cont.)

- 2) Let the students write poetry about how they use their 5 senses for their scrapbook.
- 3) Reading poems about the senses and making copies for their scrapbook (Childcraft, Vol. 14, pp. 75-91).
- 4) Have the students list ways that they use their 5 senses to live and survive.
- 5) Look up and discuss and also observe ways that animals use their 5 senses.
- 6) Discuss ways to take care of our senses.

Follow-up Activities:

Emphasize the use of the 5 senses throughout the 4 seasonal changes. This might be done through the use of a bulletin board that is changed as the seasons change.

Evaluation:

- 1) The students can recognize the importance of their 5 senses in relationship to the environment.
- 2) The students can determine ways that wildlife uses its 5 senses.
- 3) The students will determine pleasant and unpleasant things in nature through the use of their 5 senses.
- 4) The students are interested in protecting the beauty that they can see, hear and feel.
- 5) The student is aware of the beauty, serenity and mystery involved throughout our different environments.

Reference Materials:

- 1) Curriculum Guides
- 2) Observing Our Environment Through Our Senses: A Teacher's Guide, Staskey, Paul (Dr.), Davenport, Iowa, 52802
- 3) Teacher's Curriculum Guide to Conservation Education, edited by Brennan, Matthew J., Pinchot Institute, 1969, available at the Bourbon County Schools Materials Center
- 4) "Ear Training for Middle Grades", record
- 5) "Songbirds of America in Color, Sound and Story", record
- 6) "The Bird World of Song", record
- 7) "Noisy and Quiet: Big and Little", record
(Records may be obtained from the University of Kentucky, Regional Special Education Instructional Materials Center, Lexington, Kentucky.)
- 8) "Listen: There are Sounds Around You", record and filmstrips, University of Kentucky, Regional Special Education Instructional Materials Center, Lexington, Kentucky
- 9) "Sound and How it Travels", film, 11 min., color
- 10) "Hear Better: Healthy Ears", film, 11 min., color
- 11) "The Wonderful World of Seasonings", free materials, Advertising Department, 1 Mustard Street, Rochester, New York, 14609
- 12) "Chocolate: America's Favorite Flavor", free materials, Chocolate Information Council, 777 Third Avenue, New York, New York, 10017
- 13) Childcraft: The How and Why Library, Vol. I, II and XIV, 1972 edition, Field Enterprises Corporation